International Journal of Community Medicine and Public Health
Kubai EK et al. Int J Community Med Public Health. 2026 Feb;13(2):537-545
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20260030

Original Research Article

Antibiotic prescribing patterns at outpatient in Nanyuki Teaching and Referral Hospital, Laikipia County, Kenya

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Received: 19 December 2025
Revised: 12 January 2026
Accepted: 13 January 2026

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ABSTRACT

Background: Antibiotics are the most commonly and often imprudently used therapeutics globally. The study of use of antibiotic is vital, as irrational use is a global public health threat. Very few studies are done on the out-patient prescribing patterns of antibiotic in Kenya. This study aimed to evaluate the antibiotic prescription patterns in the outpatient department in Nanyuki Teaching and Referral Hospital in Laikipia.
Methods: We adopted a point prevalence study using the out-patient global PPS tool. Important variables had data represented in frequency tables and graphs. Chi-square determined the association between categorical variables and t-test for continuous variables. Confidentiality of data will be maintained throughout the study and STATA was used for analysis.
Results: The point prevalence of antimicrobial use was (29.1%) patients who were receiving at least one antimicrobial agent at the time of the survey. Penicillins were the most commonly prescribed class (41.5%) followed by cephalosporins (21.6%). By age group, children had the highest proportion of prescriptions at 40.4%. Most common diagnostic indication was community acquired infection 89.5% that had least one antimicrobial while the highest infection is respiratory infections, at 26.3% of the cases, followed by gastrointestinal infections 19.8%. Cultures were rarely performed before initiating therapy, accounting for 1.8% only. Only 11.7%, of prescriptions were guided by existing local protocols.
Conclusions: This study recommends strengthening antimicrobial stewardship (AMS) committees to routinely review prescribing trends, alongside expanding diagnostic services as culture and sensitivity facilities to support evidence-based antibiotic use. Additionally, improve the utilization of guidelines in treatment.

Keywords: Antibiotics, Prescribing, Patterns, Outpatients

INTRODUCTION

Antibiotics have been used for decades in the treatment and prevention of infectious diseases, consequently declining the morbidity and mortality of humanity.[1] Antibiotic prescription varies between countries and continents in Africa and Asia 50% of the patients receive antibiotic while 33% of patients receive antibiotics in Europe.[2] The difference in the rate of hospital acquire infections and disease burden in low- and middle-income countries facilities can explain this notable contrast.[3]

In Sub Sahara Africa, several studies have been done on the prevalence of antibiotic consumption in many countries and in several health institutions. A study was done in 17 hospitals across four countries that include Ghana, Tanzania, Zambia and Uganda the average prevalence of antibiotic prescription was 50% (30-57%) With the most prescribed antibiotics being on the "Access" and "watch" list.[4]

There has a significant decline in rational use of antibiotics in Kenya over a period of time, a study done in 2020 in the

inpatient of 14 public hospitals in different regions in the country showed antimicrobial prescribing rate to be at 46.7% and the antibiotics being 94% of the prescribing rate (Maina et al). This was also mirrored in another study conducted in Kenya in one of the leading referral hospital, 67.7% of the patients admitted where at least on antibiotic with ceftriaxone, a broad-spectrum antibiotic being the most prescribed.[5] In Kenya the outpatient, though limited studies have been done, prevalence of antibiotic prescribing is 31.1% meaning in every three patient one is always prescribed for an antimicrobial.[6] However very few studies have been done on outpatient prescribing patterns of antimicrobials in Kenya. There is limited set up and implementation for National action plan on antibiotic use in Sub Saharan Africa countries.[7] However, Ministry of Health recently launched a national action plan on antibiotic consumption and antibiotic resistance.[8]

This study therefore formed a basis on assessment on antibiotic use which is of global concern. It will be used as future guidance on potential strategies to improve utilization in antibiotics use. According Literature review little no studies in Kenya have been done so far in the hospital outpatient to address prescribing patterns. The objective of this study was to access the antibiotic prescription patterns among out-patient attending Nanyuki Teaching and Referral Hospital, Kenya.

The findings of the study will befit multi –professional in the health care sector in Kenya at large as it is an audit and feedback on antibiotic prescribing practices. This forms a basis for target of quality improvement as well as interventions in both tracking antibiotic consumption and prescribing culture.

The general objective of the study was to assess the antibiotic prescription patterns among out-patient attending Nanyuki Teaching and Referral Hospital, Kenya, specifically looking at the prevalence of antibiotic prescribing in out-patient department at Nanyuki Teaching and Referral Hospital. Additionally, determining the clinical characteristics, category, appropriateness of antibiotic prescribed among the out-patient department at Nanyuki Teaching and Referral Hospital.

METHODS

Study setting

The study was carried at Nanyuki Teaching and Referral Hospital a level 4 hospital, located in Laikipia county. The total daily outpatient capacity in the hospital is 500-700 patients on week days and 300-400 patients on the weekend.

Study design

The study design was the outpatient global point prevalence study.[9] The point prevalence study was used to ascertain the prevalence and patterns of antibiotic prescribing at specific point in time at Nanyuki Teaching and Referral Hospital outpatient department. The GPPS is a cross-sectional point prevalence survey of patient records in the outpatient department to assess antibiotic prescribing patterns.

Time frame of data collection

The global point prevalence data collection was carried out for four consecutive weeks from 01 February to 28 February 2025. Each outpatient clinic in the facility was completed within at least four hours, unless the consultation period was shorter, in which case the survey was conducted for the entire duration of the clinic session. The pre-defined time frames recommended for the global point prevalence survey (PPS) outpatient study were May–August, September–December, or January–April.

Study population

The global point prevalence study was conducted on all patients visiting the outpatient department of Nanyuki Teaching and Referral Hospital during the defined survey period who did not require overnight admission or stay. The study population consisted of patients attended in the outpatient department, whether by appointment or walk-in.

Inclusion criteria

Outpatient clinic level

All clinics housed in the outpatient department of the facility were included. Each outpatient unit was surveyed once on a single day within a timeslot of at least four hours. In cases where consultation sessions lasted less than four hours, the entire consultation session was surveyed. Different clinics were surveyed on different days, and the entire outpatient department was surveyed within four weeks from the start of data collection.

Patient level

The patient population comprised all those attending the outpatient department who did not require overnight admission. These included patients seen in any outpatient clinic during the defined timeslot of the point prevalence survey within the consecutive four weeks of the study, regardless of whether they had an appointment.

Patients in specific units such as the emergency or observation rooms who remained overnight while awaiting transfer to inpatient wards and were still present during the timeframe of surveillance were also included.

Exclusion criteria

Patients on consultation beyond the study period of at least four hours per each clinic of study. The inpatient patients were also excluded.

Data instruments and collection

The outpatient global PPS tool was used to collect quantitative data. The PPS tool has two sets of forms. The unit form captured details such as the date of the survey, institution name, unit or specialty type, consultation room name (for clinics with more than one room), and the time slot of data collection on the survey day.

The patient form contained two sections. The first section collected general patient details for all individuals visiting the outpatient department. This included the clinic unit or room, a unique patient identifier for local patient-level tracing, the survey number generated by the tool, patient age, and presenting symptoms. The second section was completed only for patients who received at least one antibiotic prescription. This captured additional details such as patient weight (or birth weight for neonates), treatment based on biomarkers (C-reactive protein, procalcitonin, white blood cell count), type of biological fluid sample collected, treatment based on point-of-care or rapid diagnostic tests, underlying morbidity, antibiotic prescribed (including whether the course was new or ongoing), route of administration (parenteral or oral), appropriateness of administration (dose, frequency, and duration), clinical diagnosis, type of indication (treatment or prophylaxis), availability of local guidelines, and compliance with such guidelines.

Data analysis

Descriptive statistics

Calculation of the prevalence of antibiotic use, the prevalence was analyzed according to different age groups. Descriptive statistics was used to summarize and describe the study variables as appropriate using means and standard deviations for continuous variables while using frequency and percentages for categorical variables. The frequency and percentage for categorical variables such as the proportion of the diagnosis, proportion of antibiotics, proportion of clinical diagnosis, type of indication (community acquired or hospital acquired), and the proportion of the guideline compliance

Bivarient analysis

The association between categorical variables was determined using Chi-square for the association of the use of antibiotics among various departments, association of antibiotics among various age groups. T-test was used to determine the association between two continuous variables.

Informed consent

A written informed consent was obtained from all participants who were truly informed about the study, potential benefits and risk.

Confidentiality

Data was completely anonymized and electronic data had a password protected which was only accessible to the principal investigator.

Ethical approval

Ethical approval was obtained from the institutions ethics review board: Jomo Kenyatta University of Agriculture and Technology (JKUAT) JKU/ISERC/02316/1419, Institutional Ethics Review Committee (ISREC) and National Commission of Science, Technology and Innovation (NACOSTI)-NACOSTI/P/25/415113. The study only proceeded following the authorization from the Chief Executive officer Nanyuki Teaching and Referral Hospital.

RESULTS

Socio-demographics

The study comprised 587 patients who attended various outpatient department clinics during the study period. As illustrated in Figure 1, the majority were female (64.6%, n=379), and most belonged to the adult age group (80.9%, n=475).

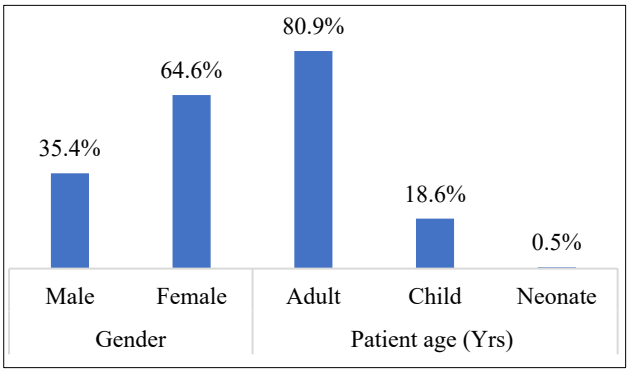

Figure 1: Distribution of patients by gender and age group.

Prevalence of antibiotics and prescribing patterns

Prevalence

As shown in Table 1, the point prevalence of antimicrobial use was 29.1% (171/587), representing patients who were receiving at least one antimicrobial agent at the time of the survey. As shown in Table 1, penicillin was the most commonly prescribed class (41.5%, n=71), followed by cephalosporins (21.6%, n=37), macrolides (11.7%, n=20), and nitroimidazole derivatives (10.5%, n=18). When antibiotic use is segregated across various variables, distinct patterns emerge (Table 2). Prescription was almost equally distributed by gender, with 29.3% (61/208) in males and 29.0% (110/379) in females, and the difference was not statistically significant (p=0.938). By age group,

children had the highest proportion of prescriptions at 40.4% (44/109) compared to 26.7% (127/475) among adults, while no neonates received antibiotics 0.0% (0/3). This difference was statistically significant (p=0.010).

Table 1: Antibiotic prevalence.

Antibiotics class used	N	%
Penicillin's	71	41.5
Cephalosporins	37	21.6
Macrolides	20	11.7
Nitroimidazole derivatives	18	10.5
Furadantin	8	4.7
ANT_TBS	7	4.1
Quinolones	6	3.5
Tetracycline	1	0.6
Rifamycins	1	0.6
Macrolides/azole	1	0.6
Aminoglycosides	1	0.6
Total	171	100.0

Across clinical units, the highest prevalence of antibiotic use was observed in the general clinic 36.9% (132/358) and other units 37.5% (9/24). In contrast, surgical departments recorded the lowest prevalence 6.4% (3/47), while specialized clinics had 17.1% (27/158). The variation across units was significant (p<0.001).

Table 3 shows the association between antimicrobial class use and patient specialty was statistically significant (p<0.001). Penicillins and cephalosporins were the most frequently prescribed classes across specialties. Across age groups, the association was also statistically significant (p=0.037), with penicillins remaining the dominant class prescribed in both adults and children (Table 4). Across types of indication, the association was statistically significant (p<0.001), with penicillins and cephalosporins again being the leading classes, particularly in community-acquired infections (CAI) (Table 5).

The prescribing of antibiotics according to the WHO AWaRe classification, the prevalence of prescribing is the 61% of antibiotics were in the Access class of antibiotics and 37% were in the watch class of antibiotics while 2% was from the not recommended class of antibiotics.

Table 2: Antibiotics prescriptions patterns.

Characteristics	Antimicrobial prescribed/administered						
	Yes		No		Total		
	N	%	N	%	N	%	X^2, p≤0.05
Gender							
Male	61	29.3	147	70.7	208	100.0	0.938
Female	110	29.0	269	71.0	379	100.0	
Patient age group							
Adult	127	26.7	348	73.3	475	100.0	0.010
Child	44	40.4	65	59.6	109	100.0	
Neonate	0	0.0	3	100.0	3	100.0	
Unit name merged							
General clinic	132	36.9	226	63.1	358	100.0	<0.001
Surgical department	3	6.4	44	93.6	47	100.0	
Specialized clinic	27	17.1	131	82.9	158	100.0	
Others	9	37.5	15	62.5	24	100.0	

Table 3: Patient specialty.

Antimicrobial class	Unit (patient specialty) (n=171)					
	General clinic (%)	Surgical dept. (%)	Specialized clinic (%)	Others (%)	Total (%)	P value
Aminoglycosides	0.8	0.0	0.0	0.0	0.6	<0.001
ANT_TBS	0.0	0.0	0.0	77.8	4.1	
Cephalosporins	19.7	33.3	37.0	0.0	21.6	
Furadantin	4.5	33.3	3.7	0.0	4.7	
Macrolides	12.9	0.0	11.1	0.0	11.7	
Macrolides/azole	0.8	0.0	0.0	0.0	0.6	
Nitroimidazole derivatives	9.1	0.0	22.2	0.0	10.5	
Penicillins	47.7	33.3	22.2	11.1	41.5	
Quinolones	3.8	0.0	3.7	0.0	3.5	
Rifamycins	0.0	0.0	0.0	11.1	0.6	

Continued.

Antimicrobial class	Unit (patient specialty) (n=171)					
	General clinic (%)	Surgical dept. (%)	Specialized clinic (%)	Others (%)	Total (%)	P value
Tetracycline	0.8	0.0	0.0	0.0	0.6	
Total	100.0	100.0	100.0	100.0	100.0	

Table 4: Age group.

Antimicrobial class	Age group			
	Adult (%)	Child (%)	Total (%)	P value
Aminoglycosides	0.0	2.3	0.6	0.037
ANT_TBS	3.1	6.8	4.1	
Cephalosporins	17.3	34.1	21.6	
Furadantin	6.3	0.0	4.7	
Macrolides	14.2	4.5	11.7	
Macrolides/Azole	0.8	0.0	0.6	
Nitroimidazole derivatives	13.4	2.3	10.5	
Penicillins	39.4	47.7	41.5	
Quinolones	3.9	2.3	3.5	
Rifamycins	0.8	0.0	0.6	
Tetracycline	0.8	0.0	0.6	
Total	100.0	100.0	100.0	

Table 5: Type of indication.

Antimicrobial class	Type of indication						
	Unknown (%)	Other (%)	MP (%)	HAI (%)	CAI (%)	Total (%)	P value
Aminoglycosides	0.0	0.0	0.0	0.0	0.7	0.6	<0.001
ANT_TBS	0.0	0.0	60.0	0.0	2.6	4.1	
Cephalosporins	0.0	14.3	20.0	0.0	22.9	21.6	
Furadantin	0.0	14.3	0.0	0.0	4.6	4.7	
Macrolides	33.3	0.0	0.0	0.0	12.4	11.7	
Macrolides/azole	0.0	0.0	0.0	0.0	0.7	0.6	
Nitroimidazole derivatives	0.0	14.3	0.0	33.3	10.5	10.5	
Penicillins	66.7	57.1	0.0	66.7	41.2	41.5	
Quinolones	0.0	0.0	0.0	0.0	3.9	3.5	
Rifamycins	0.0	0.0	20.0	0.0	0.0	0.6	
Tetracycline	0.0	0.0	0.0	0.0	0.7	0.6	
Total	100.0	100.0	100.0	100.0	100.0	100.0	

Clinical characteristics, category and appropriateness

Descriptives: clinical characteristics and symptoms

Table 6 presents clinical characteristics of the 587 patients who attended outpatient clinics and were included in the point prevalence survey of antimicrobial use. The table outlines key clinical issues, including presenting symptoms, underlying conditions, and diagnostic indications relevant to antimicrobial prescribing.

Those who were on antimicrobials were 29.1% (171). The most common diagnostic indication was with at least one antimicrobial respiratory infection, accounting for 26.3% (45) of cases, followed by gastrointestinal infections 19.8% (34), prophylaxis 17.5% (30), and skin and soft tissue infections 8.18% (14).

With respect to specialty, the majority of patients were managed under general practitioner practice 61.0% (358), followed by general internal medicine mixed 10.9% (64), obstetrics 6.3% (37), surgical mixed 6.0% (35), and gynecology 4.4% (26).

At the unit level, the majority of cases were from general clinics 61.0% (358), followed by specialized clinics 26.9% (158), surgical departments 8.0% (47), and other units 4.1% (24).

Table 6: Summary of indications, symptom groups, and specialty distribution.

Diagnostic indications	N	Percentage
RESP	45	26.3
GI	34	19.8
Proph	30	17.5
SST	14	8.18
ENT	10	5.84
GUOB	9	5.26
Other	8	4.68
DEN	8	4.68
Cys	8	4.68
BAC	2	1.12
UNK	1	0.58
PUO	1	0.58
DST	1	0.58
Total	171	100.0
General practitioner practice	358	61.0
General internal medicine mixed	64	10.9
Obstetrics	37	6.3
Surgical mixed	35	6.0
Gynaecology	26	4.4
Ear nose and throat	20	3.4
Orthopaedic	12	2.0
HIV-tuberculosis	12	2.0
Dialyses	12	2.0
Dental clinic	9	1.5
Haematology-oncology	2	0.3
Total	587	100.0
General clinic	358	61.0
Specialized clinic	158	26.9
Surgical department	47	8.0
Others	24	4.1
Total	587	100.0

Appropriateness of antimicrobial use

Table 7 presents indicators of antimicrobial use among the 171 patients prescribed antimicrobials. Cultures were rarely performed before initiating therapy, with only 1.8% (3) of cases documented, while 24.6% (42) were unknown and 73.7% (126) had no cultures taken therefore treatment was largely empirical. Additionally, only 3.6% (21) of prescriptions were based on point-of-care tests or rapid diagnostic tests (POCT/RDT).

Regarding prescription status, 66.7% (114) were new prescriptions, while 33.3% (57) were continuations. Among those with ongoing therapy, the majority 82.5% (47) originated from Nanyuki Teaching and Referral Hospital, with 15.8% (9) from unknown sources and 1.8% (1) from other facilities.

Most antimicrobials were prescribed for community-acquired infections 89.5% (153), with healthcare-associated infections 1.8% (3), malaria prophylaxis 2.9% (5), and other indications 4.1% (7) being less common; 1.8% (3) of indications were undocumented. Documentation of clinical rationale in patient notes was present in 76.6% (131), absent in 22.2% (38), and unavailable in 1.2% (2) due to missing patient files. With respect to the availability of local guidelines for diagnosis, only 11.7% (20) of prescriptions were guided by existing local protocols. In contrast, more than half of the cases 56.7% (97) reported no local guideline. In 29.2% (50) of prescriptions, guidelines were not indicated for the condition under treatment, while in 2.3% (4) of cases the status was unknown.

Table 7: Indicators of antimicrobial use.

Indicators of antimicrobial use	N	Percentage
Cultures taken before start AM		
Yes	3	1.8
Unknown	42	24.6
No	126	73.7
Total	171	100.0
Treatment based on POCT/RDT		
No	566	96.4
Yes	21	3.6
Prescription course		
No	114	66.7
Ongoing	57	33.3
Total	171	100.0
Previously prescribing facility		
Unknown	9	15.8
Nanyuki hosp	47	82.5
Other HC facility	1	1.8
Total	57	100.0
Type of indication		
Unknown	3	1.8
Other	7	4.1
MP	5	2.9
HAI	3	1.8
CAI	153	89.5
Total	171	100.0
Reason in notes		
Yes	131	76.6
No	38	22.2
No patient file	2	1.2
Total	171	100.0
Local guideline exists for diagnosis		
Yes	20	11.7
Unknown	4	2.3
Not indicated	50	29.2
No	97	56.7
Total	171	100.0

DISCUSSION

Antibiotics use in this study was common, with about one in three patients receiving a prescription—slightly higher

than the WHO recommendation of 15–25%.[10] This has also been observed in Sri Lanka, where a study done in the outpatient setting reported a prevalence of 35.7%.[11] Prescribing was concentrated in a few drug classes, reflecting limited diversity in antimicrobial choice. This finding is consistent with global evidence showing over-reliance on broad-spectrum antibiotics—especially those in the "access" and "watch" groups such as penicillins and cephalosporins—that are also prone to resistance.[12]

Penicillin in the study had a prevalence of 45.1%, and cephalosporins had a prevalence of 21.6%. This is similar to trends in outpatient studies in Burundi, where both penicillins and cephalosporins were the most prescribed antibiotics, with prevalence of 45% and 10.1%, respectively.[13] Additionally, a study done in Sri Lanka in the outpatient setting found penicillins at 28.1% and cephalosporins at 26%.[11]

This has also been reported across sub-Saharan Africa, where broad-spectrum cephalosporins like ceftriaxone dominate prescribing in both inpatient and outpatient settings.[14,5] A number of studies have shown similar trends in the Asian continent. In Nepal, the leading antibiotics prescribed in outpatient care were similar, with penicillins leading at 24.11% and cephalosporins at 19.19%.[15]

In the study, the prevalence of antibiotic prescriptions in the access class was 61%, the watch class was 37%, and the reserve class was 2%, which is close to the WHO recommendation of not less than 60% for the access class.[16] This is also slightly lower to a study done in Ghana on prescribing patterns at a hospital, where the prevalence of prescriptions in the access class of antibiotics was 74% and in the watch class was 24%.[17]

Prescribing patterns in this study varied significantly by age and clinical specialty. The pediatric population aged 17 years and under had the highest percentage of antibiotic prescriptions at 40.4%. This is very similar to a study in Kenya where children aged 18 years and below had the most prescriptions for antibiotics.[18] The most prescriptions with antibiotics were in the general clinic at 36.9%. This was similar to a study done in Nepal in the outpatient setting, where the general medicine department had the most patients treated with antibiotics at 44%.[15] Literature from West Africa and Kenya concurs that children often experience higher rates of antibiotic exposure, raising concerns about early and potentially unnecessary prescribing.[19] Similarly, outpatient and general clinics have repeatedly been identified as hotspots of antibiotic use, driven by high patient volumes and reliance on empirical therapy.[20]

The most common indication for prescribing antibiotics was community-acquired infection at 89.3%, with the leading infections being respiratory infections at 26.3% and gastrointestinal infections at 19.2%. A similar study done in Kenya on antibiotic prescribing patterns in western and coastal regions indicated that the most prevalent infection was respiratory infections as well, at 42.4%.[18] Additionally, this was also similar to a study done in Ethiopia where the leading infections were gastrointestinal infections at 27.5% and lower respiratory infections at 19%.[21]

Rational use of antibiotics is encouraged by the utilization of diagnostic testing when selecting the antibiotic of choice. The greatest choice of targeted treatment is culture and sensitivity, where treatment is narrowed down to the susceptibility pattern. The total targeted treatment in the facility was very minimal at 1.8%. This is also echoed in a study done in Tanzania where the utilization of culture and sensitivity for the management of infections was less than 1%.[22] Additionally, the scenario is not any different in Ethiopia, where there was no complete utilization of culture and sensitivity.[23] Most treatment in this study was empirical, with limited diagnostic support. This reflects a systemic gap across many low- and middle-income countries where laboratory infrastructure is either absent, unaffordable, or underutilized.[14,24] Studies in East Africa, including Tanzania and Kenya, have emphasized that lack of access to culture and sensitivity testing perpetuates reliance on clinical judgment, thereby increasing the risk of inappropriate use.[20]

The utilization of guidelines was significantly low at a percentage of 11.7%. This is a key indication that there is very poor use of guidelines regardless of their availability. The utilization of guidelines was significantly low compared to a regional hospital in Kenya that indicated the utilization of guidelines to be at 45.8%.[19] Additionally, this was significantly lower compared to a study done in Lusaka, where 58.1% were compliant with guidelines.[25] This calls for a quality improvement project to ensure utilization of guidelines in the facility.

CONCLUSION

Antibiotic prescribing prevalence was 29.1%. Penicillins (41.5%) and cephalosporins (21.7%) were most used, with smaller shares for macrolides (11.7%) and nitroimidazoles (10.5%). Children had higher use (40.4%) than adults (26.7%) ($p=0.010$), with none in neonates. Prescribing differed across specialties, highest in general clinics (36.9%) and lowest in surgical departments (6.4%) ($p<0.001$). Average duration was 10 days, about 3 doses daily. Most common diagnostic indication was community acquired infection accounting for 89.5% was with at least one antimicrobial while the highest infection is respiratory infections, at 26.3% of the cases, followed by gastrointestinal infections 19.8%. Most treatment was empirical; cultures (1.8%) and point-of-care tests (3.6%) were rare. Only 11.7%, of prescriptions were guided by existing local protocols.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Walter E, Gibson O. The efficacy of antibiotics in reducing morbidity and mortality from heatstroke - A systematic review. J Therm Biol. 2020;88.
2. World Health Organization. Pocket book of hospital care for children: Second edition. 2013. Available at: https://www.who.int/publications/i/item/978-92-4-154837-3. Accessed on 12 November 2025.
3. Zanichelli V, Monnier AA, Gyssens IC, Adriaenssens N, Versporten A, Pulcini C, et al. Variation in antibiotic use among and within different settings: a systematic review. J Antimicrob Chemother. 2018;73:vi17-29.
4. Arcy ND, Ashiru-oredope D, Olaoye O, Afriyie D, Akello Z, Ankrah D, et al. Antibiotic Prescribing Patterns in Ghana, Uganda, Zambia and Tanzania Hospitals: Results from the Global Point Prevalence Survey (G-PPS) on Antimicrobial Use and Stewardship Interventions Implemented. Antibiotics (Basel). 2021;10(9):1122.
5. Okoth C, Opanga S, Okalebo F, Oluka M, Baker Kurdi A, Godman B. Point prevalence survey of antibiotic use and resistance at a referral hospital in Kenya: findings and implications. Hosp Pract (1995). 2018;46(3):128-36.
6. Porto APM, Goossens H, Versporten A, Costa SF; Brazilian Global-PPS Working Group. Global point prevalence survey of antimicrobial consumption in Brazilian hospitals. J Hosp Infect. 2020;104(2):165-71.
7. Elton L, Thomason MJ, Tembo J, Velavan TP, Pallerla SR, Arruda LB, et al. Antimicrobial resistance preparedness in sub-Saharan African countries. Antimicrob Resist Infect Control. 2020;9(1):1-11.
8. Republic of Kenya. National Policy on Prevention and Containment of Antimicrobial Resistance. 2017. Available at: www.health.go.ke. Accessed on 30 October 2025.
9. Goossens H. The Global-PPS on antimicrobial consumption and resistance will allow for targeted quality improvements, the development of local prescribing guidelines, education and practice changes, and also for measuring the impact of these interventions," said. 2023. Available at: www.biomerieux.com. Accessed on 30 October 2025.
10. Ata M. Antibiotics Prescribing Pattern at Outpatient Department of a Tertiary Medical College Hospital. 2018;17. Available at: www.banglajol.info/index.php/CMOSHMCJ. Accessed on 30 October 2025.
11. Zhang HL, Bodinayake C, Wijayaratne GB, Jayatissa P, Piyasiri DLB, Kurukulasooriya R, et al. Point-prevalence survey of outpatient antibiotic prescription at a tertiary medical center in Sri Lanka: opportunities to improve prescribing practices for respiratory illnesses. BMC Infect Dis. 2021;21(1).
12. Van Boeckel TP, Gandra S, Ashok A, Caudron Q, Grenfell BT, Levin SA, et al. Global antibiotic consumption 2000 to 2010: an analysis of national pharmaceutical sales data. Lancet Infect Dis. 2014;14(8):742-50.
13. Manirakiza A, Maru SM, Nyamu DG, Bizimana T, Nimpagaritse M. Antimicrobial prescribing patterns among pediatric outpatient encounters in primary healthcare centers in Bujumbura Mairie, Burundi. BMC Prim Care. 2025;26(1):1-9.
14. Maina M, Mwaniki P, Odira E, Kiko N, McKnight J, Schultsz C, et al. International Journal of Infectious Diseases Antibiotic use in Kenyan public hospitals: Prevalence, appropriateness and link to guideline availability. Int J Infect Dis. 2020;99:10-8.
15. Sapkota K, Pokharel D, Basel S, Dhakal B. Antibiotics Prescribing Pattern of Outpatients in a Tertiary Level Hospital in Nepal. J Coll Med Sci. 2023;19(4):392-8.
16. AWaRe classification of antibiotics for evaluation and monitoring of use. 2023. Available at: https://www.who.int/publications/i/item/WHO-MHP-HPS-EML-2023.04. Accessed on 30 October 2025.
17. Darkwah TO, Afriyie DK, Sneddon J, Cockburn A, Opare-Addo MNA, Tagoe B, et al. Assessment of prescribing patterns of antibiotics using National Treatment Guidelines and World Health Organization prescribing indicators at the Ghana Police Hospital: a pilot study. Pan Afr Med J. 2021;39:222.
18. Kiener M, Ichura C, Ndenga BA, Mutuku FM, Winter CA, Okuta V, et al. Antibiotic prescribing patterns at outpatient clinics in Western and Coastal Kenya. PLOS Glob Public Heal. 2025;5(1).
19. Lydia M. Antibiotic Prescribing Patterns at Rift Valley Provincial. 2017. Available at: https://ereposit ory.uonbi.ac.ke/bitstream/handle/11295/102500/Momanyi_Antibiotic%20Prescribing%20Patterns%20at%20Rift%20Valley%20Provincial%20General%20Hospital%20a%20Point%20Prevalence%20Survey.pdf?sequence=1. Accessed on 30 October 2025.
20. Seni J, Mapunjo SG, Wittenauer R, Valimba R, Stergachis A, Werth BJ, et al. Antimicrobial use across six referral hospitals in Tanzania: A point prevalence survey. BMJ Open. 2020;10(12):1-9.
21. Yimenu DK, Emam A, Elemineh E, Atalay W. Assessment of Antibiotic Prescribing Patterns at Outpatient Pharmacy Using World Health Organization Prescribing Indicators. J Prim Care Commun Health. 2019;10.
22. Nsojo A, George L, Mwasomola D, Tawete J, Mbotwa CH, Mweya CN, et al. Prescribing patterns of antimicrobials according to the WHO AWaRe classification at a tertiary referral hospital in the southern highlands of Tanzania. Infect Prev Pract. 2024;6(2):100347.
23. Bulcha B, Motuma B, Tamiru Y, Gurmessa WT. Assessment of Knowledge, Attitude and Practice (KAP) Regarding Antimicrobial Usage and Resistance Among Animal Health Professionals of

East Wallaga Zone, Oromiya, Ethiopia. Vet Med Res Rep. 2024;15:57-70.
24. Dobson EL, Klepser ME, Pogue JM, Labreche MJ, Adams AJ, Gauthier TP, et al. Outpatient antibiotic stewardship: Interventions and opportunities. J Am Pharm Assoc. 2017;57(4):464-73.
25. Mudenda S, Chomba M, Chabalenge B, Hikaambo CN, Banda M, Daka V, et al. Antibiotic Prescribing Patterns in Adult Patients According to the WHO AWaRe Classification: A Multi-Facility Cross-Sectional Study in Primary Healthcare Hospitals in Lusaka, Zambia. Pharmacol Pharm. 2022;13(10):379-92.

Cite this article as: Kubai EK, Mokaya D, Gachohi J. Antibiotic prescribing patterns at outpatient in Nanyuki Teaching and Referral Hospital, Laikipia County, Kenya. Int J Community Med Public Health 2026;13:537-45.