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Antibiotic Utilization in Nephrological and Respiratory Infections: A Prospective Cohort Observational Study

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ABSTRACT

Antibiotic utilization plays a vital role in healthcare by ensuring effective bacterial infection management while mitigating resistance risks. This study aims to examine the pattern of antibiotic utilization in respiratory and nephrological disease. A prospective cohort observational study was conducted over six months in the nephrology and respiratory wards, involving 200 patients, following approval from the Institutional Ethics Committee of GCS Medical College & Research Centre. Patients aged 18 years or older with diagnosed nephrological or respiratory conditions who provided informed consent were included, while those with incomplete medical records were excluded. Statistical analysis involved mean, mode, and percentage. Our findings shows that antibiotic prescriptions were more common among male patients, with AKI on CKD (15.5%) and LRTI (19%) being the most frequently observed conditions. Prophylactic antibiotic use significantly reduced infection risks, particularly in nephrology patients. In the respiratory department, 62.54% of prescriptions were based on suspected infections. Cephalosporins were the most commonly used antibiotics. This study concluded that appropriate utilization of antibiotics is crucial for ensuring their continued effectiveness and minimizing the risks associated with antimicrobial resistance. A multidisciplinary approach involving healthcare professionals, policymakers, and the public is necessary to combat AMR and safeguard global health for future generations.

Keywords- Antibiotic Stewardship, Nephrological Infections, Respiratory Infections, Prospective Cohort, Study Antimicrobial Resistance (AMR).

I. INTRODUCTION

Chronic kidney disease (CKD) affects over 10% of the global population, posing significant social and economic challenges [1]. Managing medication regimens for patients undergoing hemodialysis (HD) is particularly complex due to factors such as polypharmacy, multiple comorbidities, and altered drug clearance. One of the most pressing concerns for HD patients is their heightened susceptibility to infections, particularly those caused by multidrug-resistant (MDR) organisms. Infections are a leading cause of morbidity and the second most common cause of mortality in this patient group [2-5]. Among the various complications associated with CKD, proteinuria has been linked to an increased risk of infections [6]. Studies indicate that patients with proteinuria face a 10% higher likelihood of developing lower respiratory tract infections and a 30% increased risk of sepsis compared to those without proteinuria [7]. Respiratory tract infections (RTIs) are among the most prevalent medical conditions encountered in both outpatient and inpatient settings. These infections can range from mild cases, such as the common cold and pharyngitis, to severe illnesses like

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pneumonia and exacerbations of asthma [8]. Effective management of RTIs often necessitates the use of antibiotics, making their appropriate prescription a critical component of clinical practice [9]. Drug Utilization Evaluation (DUE) is a systematic method employed to assess and optimize medication use patterns. In the context of RTIs, DUE plays a vital role in evaluating the appropriateness, effectiveness, and safety of antibiotic therapy in alignment with established clinical guidelines [10]. By systematically analyzing antibiotic prescribing patterns, DUE helps healthcare professionals identify and correct instances of misuse, overuse, or deviation from evidence-based recommendations. The implementation of DUE is crucial for mitigating antimicrobial resistance (AMR), as it can uncover inappropriate prescribing practices, such as the unnecessary use of antibiotics for viral infections or deviations from recommended dosage regimens [11]. This study aims to examine the pattern of antibiotic utilization in respiratory and nephrological disease.

II. OBJECTIVES

- To determine the prevalence and burden of nephrology- and respiratory-related diseases in various demographic groups.
- To analyze the number and frequency of antibiotics prescribed for nephrology and respiratory diseases.
- To evaluate the transition from one antibiotic regimen to another in nephrology and respiratory disease management.
- To identify the primary indications for antibiotic prescriptions in patients with nephrology and respiratory disorders.
- To categorize and analyze the utilization of different antibiotic classes among various age groups.
- Comprehensive Analysis of Antibiotic Utilization Patterns in Nephrology and Respiratory Diseases

III. METHODOLOGY

Study site: GCS Medical College & Research Centre, Ahmedabad, Gujarat, India
Study design: A cohort prospective observational study
Study duration: 6 months
Study population: 200 inpatients from nephrological & respiratory wards.
Study Ethical Approval: This study was approved by the institutional ethics committee of GCS Medical College & Research centre.

Inclusion criteria:

- Patients aged 18 years and older.
- Patients diagnosed with any nephrological or respiratory conditions.
- Patients who voluntarily consent to participate in the study, demonstrating a clear understanding of the study's purpose and procedures.

Exclusion criteria:

- Patients who underwent surgical procedures during their hospital stay or were admitted specifically for surgery will be excluded from the study.
- Patients with incomplete or missing medical records will not be considered.

Development of CRF:

After finalizing the protocol, a well-structured, protocol-driven paper-based Case Report Form (CRF) is designed to ensure efficient and systematic data collection. This CRF includes detailed sections to capture patient demographics, medical history, clinical diagnosis, prescribed treatments, and other critical study-related information, facilitating streamlined data entry and enhancing study workflow.

Method of data collection:

The study was conducted at GCS Hospital, Ahmedabad, Gujarat, a 750-bed multi-specialty healthcare facility. This hospital-based, prospective observational study took place in the Nephrology and Respiratory departments over a six-month period. A total of 200 patients receiving treatment for nephrological and respiratory tract infections, with or without antibiotics, were included. Patient medical records were reviewed to collect comprehensive data, which was systematically documented using a structured patient proforma. The collected information included:

- **Socio-demographic details**: Age, gender, occupation, and lifestyle habits.
- **Clinical and treatment-related data**: Diagnosis, laboratory findings, and antibiotic prescriptions (including trade and generic names, dosage, dosing frequency, route of administration, and treatment duration).

Additionally, patient interactions provided insights into their current symptoms, history of infections, prior medication use, addictions, allergies, and symptomatic relief to assess the efficacy of prescribed antibiotic therapy. Given that many participants were either illiterate or had only basic formal education, the study team explained each aspect of the Case Record Form (CRF) in the patient's preferred language to ensure clarity and comprehension. Furthermore, data on antibiotic resistance patterns were obtained from the hospital's Microbiology Department for the period spanning September to February 2023. The collected data was systematically analyzed to determine the prevalence of nephrological and respiratory tract infections and evaluate antibiotic prescription patterns.

Study procedure:

We conducted daily hospital visits to systematically collect data from patient medical records using a specially designed data collection form. Additionally, direct patient inquiries were made to ensure comprehensive and accurate data acquisition.

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Statistical analysis:

The data was then systematically transferred to an Excel sheet. Descriptive statistical methods, including mean, mode, and percentage calculations, were applied.

IV. RESULTS

Table 1 shows that this comprising 116 males (58%) and 84 females (42%), indicating a higher representation of male patients. A total of 372 antibiotics were prescribed, with 219 (58.87%) administered to male patients and 153 (41.13%) to female patients. This distribution reflects a greater proportion of antibiotic prescriptions among male patients compared to females.

Table 1: Gender based distribution

Category	Gender distribution		Total
	Male	Female	n
Number of patients	116 (58%)	84 (42%)	200 (100%)
Antibiotic Used	219 (58.87%)	153 (41.13%)	372 (100%)

Table 2 shows that Antibiotic usage demonstrates an increasing trend with age, with the highest prevalence observed in the 56–65 and 66–75 age groups, accounting for 98 (26.34%) and 83 (22.31%) of total prescriptions, respectively. The 46–55 age group also exhibits substantial antibiotic consumption, representing 66 (17.74%) of total usage. In contrast, the ≤25, 26–35, and >75 age groups report lower antibiotic utilization, with the 26–35 age group showing the lowest percentage at 4.30%. Despite variations in the total number of prescriptions across age groups, the average number of antibiotics prescribed per patient remains largely uniform at two per patient. Notable exceptions include the ≤25 age group, where an average of three antibiotics per patient is observed, and the 26–35 age group, which has the lowest average at one antibiotic per patient.

Table 2: Age based distribution

Age (in years)	Number of patients	Number of Antibiotics (%)	Average antibiotics prescribed in age-group
≤25	12	36 (9.67%)	3 (21.43%)
26-35	14	16 (4.30%)	1 (7.12%)
36-45	21	46 (12.36%)	2 (14.29%)
46-55	39	66 (17.74%)	2 (14.29%)
56-65	57	98 (26.34%)	2 (14.29%)
66-75	46	83 (22.31%)	2 (14.29%)
>75	11	27 (7.3%)	2 (14.29%)
Total	200	372 (100%)	14 (100%)

Table 3 shows that 139 had no history of addiction, while the remaining 61 exhibited varying social habits. Among them, 9% were smokers, 10% used tobacco, 5% engaged in both smoking and tobacco use, 3.5% combined smoking with alcohol consumption, 1% used both tobacco and alcohol, and 2% had a history of smoking, alcohol, and tobacco use. A correlation was observed between social history and antibiotic usage, though it was not highly significant. Patients with a history of smoking or tobacco use demonstrated a slightly higher tendency for antibiotic consumption compared to non-users.

Regarding formulations, In the field of respiratory medicine, oral antibiotics are prescribed in approximately 24.08% of cases, whereas their usage is slightly higher in nephrology, accounting for 27.34% of prescriptions. Intravenous (IV) antibiotics remain the preferred mode of administration in both specialties, with a significant utilization rate of 74.25% in respiratory medicine and 72.60% in nephrology, indicating a reliance on parenteral therapy for managing severe infections. Intramuscular (IM) antibiotics are rarely prescribed, with only 1.00% of cases in respiratory medicine and no reported usage in nephrology, reflecting a preference for more effective systemic routes. Similarly, intranasal antibiotics are seldom utilized, constituting only 0.67% of prescriptions in respiratory medicine and none in nephrology.

Table 3: Social history-based distribution

Social History	Number of Patients (%)	Number of Antibiotics used (%)
Smoking	18 (9%)	35 (9.4%)
Tobacco	20 (10%)	33 (8.87%)
Smoking+Alcohol	7 (3.5%)	17 (4.57%)
Smoking+Tobacco	10 (5%)	23 (6.18%)
Tobacco+Alcohol	2 (1%)	11 (2.96%)
Smoking+Tobacco+Alcohol	4 (2%)	18 (4.34%)
None	139 (69.5%)	235 (63.17%)
Total	200(100%)	372 (100%)

Table 4 shows that prevalence of nephrological and respiratory conditions. Kidney-related conditions, including acute kidney injury (AKI), AKI on chronic kidney disease (CKD), and chronic kidney disease (CKD), collectively account for approximately 30% of the cases. Respiratory disorders, such as lower respiratory tract infections (LRTI), chronic obstructive pulmonary disease (COPD), and various forms of respiratory failure, represent around 40% of the cases. Additionally, tuberculosis (TB), asthma, and pneumonia contribute to roughly 13% of the total cases. Other conditions, including obstructive airway disease (OAD), nephrotic syndrome, and upper respiratory tract infections (URTI), make up the remaining proportion.

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Table 4: Prevalence of respiratory and nephrology disease

Disease	Number of cases	Percentage (%)
AKI	11	5.5
AKI on CKD	31	15.5
Pyelonephritis	3	1.5
CKD	17	8.5
Solitary functioning kidney	1	0.5
ADPKD	2	1
Nephrotic syndrome	3	1.5
Membranous Nephropathy	1	0.5
OAD	9	4.5
LRTI	38	19
COPD	14	7
Type-1 Respiratory failure	27	13.5
Type-2 Respiratory failure	2	1
Asthma	6	3
TB	15	7.5
Pneumonia	5	2.5
Bronchiectasis	1	0.5
Bronchitis	2	1
URTI	4	2
NSCLC	1	0.5
Anterior Mediastinal mass	1	0.5
Pleural effusion	2	1
Pneumothorax	4	2
Total	200	100

Table 5 shows that number of antibiotics prescribed in nephrology and respiratory conditions. In nephrology, 37.31% of prescriptions do not include antibiotics, while the majority (55.22%) contain one or two antibiotics. A smaller fraction (7.46%) consists of three to four antibiotics. In contrast, respiratory medicine demonstrates a higher prevalence of antibiotic use, with 67.7% of prescriptions incorporating one or two antibiotics, and 25.6% including three to four. Notably, a small proportion (3.00%) of prescriptions in respiratory medicine involve five or more antibiotics.

Table 5: Number of antibiotics prescribed

NUMBER OF ANTIBIOTICS	NEPHROLOGY (%)	RESPIRATORY (%)
0	25 (37.31%)	1 (0.75%)
≤2	37 (55.22%)	90 (67.7%)
3-4	5 (7.46%)	34 (25.6%)
5-6	0 (0%)	4 (3.00%)
>6	0 (0%)	4 (3.00%)
TOTAL	67 (100%)	133 (100%)

Table 6 shows that antibiotic switchover treatment in nephrology conditions. Initial antibiotic therapy commonly involves ceftriaxone or cefoperazone-sulbactam. However, a significant number of patients require a switch to alternative antibiotics. Among those initially treated with cefoperazone-sulbactam, the most frequent switch is to cefixime, followed by meropenem, amoxicillin-clavulanic acid, and piperacillin-tazobactam. Similarly, patients started on ceftriaxone often require a transition to cefixime, with subsequent adjustments to cefixime-clavulanic acid, amoxicillin-clavulanic acid, or cefoperazone-sulbactam as needed.

Table 6: Antibiotic switchover in nephrology department

Nephrology	Started with	
Switched to	Ceftriaxone	Cefoperazone-Sulbactam
Amoxicillin-Clavulanic acid	1	2
Meropenem	0	3
Cefoperazone-Sulbactam	1	0
Azithromycin	0	1
Cefixime	2	4
Piperacillin-tazobactam	0	2
Cefixime-clavulanic acid	0	0

Table 7 shows that antibiotic switchover treatment in respiratory conditions. The most commonly prescribed initial antibiotics were amoxicillin-clavulanic acid and cefoperazone-sulbactam. However, these agents frequently required a switch to alternative therapies. Among patients initially treated with amoxicillin-clavulanic acid, therapy was often escalated to cefoperazone-sulbactam, ceftazidime, levofloxacin, amikacin, doxycycline, linezolid, azithromycin, or streptomycin, accounting for a total of 24 cases. Similarly, patients started on cefoperazone-sulbactam were frequently transitioned to alternative agents such as amikacin, piperacillin-tazobactam, ceftazidime, levofloxacin, doxycycline, ceftriaxone, azithromycin, meropenem, or colistin.

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Table 7: Antibiotic switchover in Respiratory department

Respiratory	Started with						
Switched to	Ceftriaxone	Cefoperazone-Sulbactam	Amoxicillin-Clavulanic acid	Linezolid	Piperacillin-tazobactam	Ceftazidime	Clindamycin
Amoxicillin-Clavulanic acid	5	0	0	1	0	0	0
Piperacillin-tazobactam	0	3	0	0	0	0	0
Ceftazidime	1	0	2	0	0	0	0
Levofloxacin	2	1	2	0	0	1	0
Amikacin	2	4	1	0	0	0	0
Doxycycline	0	1	3	0	1	0	0
Ceftriaxone	0	1	0	0	0	0	0
Cefoperazone-Sulbactam	1	0	13	0	0	0	0
Linezolid	0	0	1	0	0	0	0
Azithromycin	0	2	1	0	0	0	0
Streptomycin	0	0	1	0	0	0	0
Meropenem	0	1	0	0	1	0	1
Colistin	0	1	0	0	0	0	0
Cefepime	1	0	0	0	0	0	0
Total	12	14	24	1	1	1	1

Table 8 indicates the prevalence of antibiotic use in respiratory and nephrology department. In respiratory cases, 62.54% of antibiotic prescriptions were issued based on suspected infections, while only 7.7% were prescribed for confirmed bacterial infections. Additionally, 6.35% of prescriptions were for prophylactic use, and 9.36% were specifically for tuberculosis treatment. Notably, 14.05% of antibiotic prescriptions targeted lower respiratory tract infections, highlighting a significant portion of prescriptions dedicated to respiratory conditions. In nephrology cases, 61.64% of antibiotic prescriptions were initiated based on suspected infections, while only 8.22% were prescribed following a confirmed bacterial infection—an essential factor for optimizing treatment and antimicrobial stewardship. Additionally, 30.14% of prescriptions were for prophylactic purposes, highlighting the significant use of antibiotics to prevent potential infections.

Table 8: Indication of antibiotic use in Respiratory and nephrology department

Indication	Respiratory condition		Nephrology condition	
	Number	Percentage	Number	Percentage
Suspected Infection	187	62.54	45	61.64
Bacteriologically Confirmed Infection	23	7.7	6	8.22
Prophylaxis	19	6.35	22	30.14
TB	28	9.36	-	-
LRTI	42	14.05	-	-
Total	299	100	73	100

Table 9 shows that Cephalosporins (146 prescriptions, 39.25%) and Penicillins (76 prescriptions, 20.43%) are the most frequently prescribed antibiotic classes across all age groups, with Cephalosporins being the predominant choice. Macrolides (42 prescriptions, 11.29%), Quinolones (28 prescriptions, 7.52%), and Aminoglycosides (19 prescriptions, 5.11%) are also commonly utilized. Antibiotic usage generally increases with age, as reflected in the higher prescription rates among older individuals. The 56–65 age group exhibits the highest antibiotic utilization, accounting for 26.34% of total prescriptions, with Cephalosporins (12.09%) and Penicillins (4.84%) being the most prescribed. This pattern aligns with the overall prescribing trends

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observed across all age groups. In contrast, Carbapenem usage remains relatively low throughout the population, indicating limited prescriptions for this antibiotic class. Notably, a decline in antibiotic prescriptions is observed in individuals aged >75, suggesting reduced antibiotic utilization in this demographic.

Table 9: Antibiotic classes use distribution based on age

Antibiotic class used (Age-wise)										
Age	**Number of patient**	**Number of Antibiotics (%)**	**Penicillin**	**Cephalosporins**	**Quinolones**	**Aminoglycosides**	**Macrolides & lincosamides**	**Tetracyclines**	**Carbapenem**	**Others**
≤25	12	36	4 (1.07%)	8 (2.15%)	7 (1.88%)	4 (1.07%)	2 (0.54%)	0 (0%)	0 (0%)	11 (2.96 %)
26-35	14	16	4 (1.07%)	6 (1.61%)	1 (0.27%)	1 (0.27%)	2 (0.54%)	1 (0.27%)	0 (0%)	1 (0.27 %)
36-45	21	46	11 (2.96%)	15 (4.03%)	5 (1.34%)	5 (1.34%)	7 (1.88%)	1 (0.27%)	0 (0%)	2 (0.54 %)
46-55	39	66	13 (3.49%)	29 (7.79%)	4 (1.07%)	2 (0.54%)	5 (1.34%)	5 (1.34%)	2 (0.54%)	6 (1.61 %)
56-65	57	98	18 (4.84%)	45 (12.09%)	4 (1.07%)	4 (1.07%)	9 (2.41%)	2 (0.54%)	4 (1.07%)	12 (3.22 %)
66-75	46	83	21 (5.64%)	35 (9.40%)	4 (1.07%)	3 (0.81%)	11 (2.96%)	5 (1.34%)	3 (0.81%)	1 (0.26 %)
>75	11	27	5 (1.34%)	8 (2.15%)	3 (0.81%)	0 (0%)	6 (1.61%)	0 (0%)	1 (0.27%)	4 (1.08 %)
Total	200	372 (100%)	76 (20.43 %)	146 (39.25%)	28 (7.52%)	19 (5.11%)	42 (11.29%)	14 (3.76%)	10 (2.69%)	37 (9.95 %)

Table 10 shows that cephalosporins was most commonly prescribed in nephrology and respiratory condition.

Table 10: Antibiotic utilization pattern

Antibiotic used	Nephrology	Respiratory	Percentage (%)
Penicillin (n=76)			**100%**
Amoxicillin	1 (1.32%)	0 (0%)	
Amoxicillin-clavulanic	4 (5.26%)	61 (80.26%)	
Piperacillin-tazobactam	2 (2.63%)	8 (10.52%)	
Cephalosporins (n=146)			**100%**
Cefoperazone-sulbactam	30 (20.54%)	45 (30.82)	
Cefixime	7 (4.79%)	3 (2.05)	
Cefixime-clavulanic	1 (0.68%)	0 (0%)	
Ceftazidime	0 (0%)	12 (8.22%)	
Ceftazidime-tazobactam	0 (0%)	1 (0.68%)	
Ceftazidime-avibactam	0 (0%)	1 (0.68%)	
Ceftriaxone	8 (5.48%)	36 (24.66%)	
Cefpodoxime-clavulanate	0 (0%)	1 (0.68%)	
Cefepime	0 (0%)	1 (0.68%)	
Quinolones (n=28)			**100%**

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Levofloxacin	2 (7.14%)	22 (78.57%)	
Moxifloxacin	0 (0%)	2 (7.14%)	
Ofloxacin	0 (0%)	1 (3.57%)	
Ciprofloxacin	0 (0%)	1 (3.57%)	
Aminoglycosides (n=19)			**100**%
Amikacin	1 (5.26%)	15 (78.95%)	
Streptomycin	0 (0%)	3 (15.79%)	
Macrolides & Lincosamides (n=42)			**100**%
Azithromycin	2 (4.76%)	11 (26.19%)	
Clarithromycin	1 (2.38%)	1 (2.38%)	
Clindamycin	2 (4.76%)	25 (59.52%)	
Tetracyclines (n=14)			**100**%
Doxycycline	1 (7.14%)	13 (92.86%)	
Carbapenem (n=10)			**100**%
Meropenem	5 (50%)	5 (50%)	
Others (n=37)			**100**%
Fosfomycin	1 (2.70%)	0 (0%)	
Nitrofurantoin	1 (2.70%)	0 (0%)	
Aztreonam	0 (0%)	1 (2.70%)	
Colistin	1 (2.70%)	4 (10.81%)	
Bedaquiline	0 (0%)	2 (5.41%)	
Ethambutol	0 (0%)	6 (16.22%)	
Pyrazinamide	0 (0%)	3 (8.11%)	
Metronidazole	3 (8.11%)	5 (13.51%)	
Linezolid	0 (0%)	4 (10.81%)	
Isoniazid	0 (0%)	1 (2.70%)	
Rifampicin	0 (0%)	2 (5.41%)	
Ethionamide	0 (0%)	1 (2.70%)	
Cycloserine	0 (0%)	1 (2.70%)	
Sulbactam	0 (0%)	1 (2.70%)	

V. DISCUSSION

Global studies have consistently demonstrated that monitoring systems and interventions play a pivotal role in improving healthcare quality, particularly in evaluating antibiotic utilization in healthcare facilities. With the rapid escalation of antibiotic resistance, healthcare providers worldwide are facing limited treatment options.

Prior to the COVID-19 pandemic, global antimicrobial consumption had declined, with a sharper decrease observed in high-income countries (8.4%) compared to developing nations (1.2%). However, in March 2020, antimicrobial usage surged by 11.2% compared to 2019, with notable increases in both developed (48.2% rise in antiviral use, 6.9% in antibiotics) and developing countries (110.0% in antivirals, 5.9% in antibiotics) [12]. Data from the Indian Council of Medical Research (ICMR) covering January to December 2022 analyzed 107,053 positive culture isolates, identifying *E. coli* as the most frequently isolated pathogen, followed by *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, and *Klebsiella pneumoniae*. Notably, the susceptibility of *K. pneumoniae* to imipenem declined from 59% in 2017 to 42% in 2022, while *E. coli* susceptibility dropped from 81% to 66% over the same period [13].

In this study, we conducted a six-month prospective observational study at a tertiary care teaching hospital to analyze antibiotic utilization patterns among patients with nephrological and respiratory infections. A total of 200 patients were enrolled, with 67 cases from the nephrology department and 133 from the respiratory department. The higher number of respiratory cases may be attributed to seasonal variations, particularly during the winter months when respiratory infections are more prevalent.

Our findings revealed a greater prevalence of nephrological and respiratory infections in male patients compared to female patients. This disparity may be influenced by various factors, including smoking, alcohol consumption, comorbid conditions, hormonal

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differences, and lifestyle variations. The data also indicated a strong correlation between age and antibiotic use, with older age groups exhibiting higher prescription rates due to immunosenescence, increased risk of infections from comorbidities like diabetes, and greater susceptibility to hospital-acquired infections due to prolonged hospital stays and frequent hemodialysis. The highest antibiotic prescription rates were observed in the 56–75 age group, accounting for 26.34% (56–65 years) and 22.31% (66–75 years) of prescriptions. The 46–55 age group also demonstrated significant antibiotic use (17.74%), while lower prescription rates were noted in the ≤25, 26–35, and >75 age groups, with the lowest usage (4.30%) in the 26–35 age group.

Among the diagnosed conditions, acute kidney injury on chronic kidney disease (AKI on CKD) (15.5%) and lower respiratory tract infections (LRTIs) (19%) were the most prevalent, necessitating the use of multiple antibiotic classes, including cephalosporins, penicillins, macrolides, aminoglycosides, quinolones, tetracyclines, carbapenems, and others. The most frequently prescribed antibiotic was the third-generation cephalosporin cefoperazone-sulbactam (1.5 g/3 g), followed by amoxicillin-clavulanic acid (625 mg/1.2 g), levofloxacin (500 mg/750 mg), amikacin (500 mg/750 mg), clindamycin (600 mg), and doxycycline (100 mg). Most patients were prescribed a minimum of two antibiotics, with intravenous formulations being the predominant mode of administration (74.25% in respiratory cases and 72.60% in nephrology cases). Oral antibiotics accounted for 24.08% and 27.34% of prescriptions, respectively, while intramuscular and intranasal formulations were rarely used (<1% of prescriptions).

VI. CONCLUSION

The study concluded that antibiotic prescriptions were more prevalent among male patients. The most commonly observed conditions were AKI on CKD (31 cases, 15.5%) and LRTI (38 cases, 19%). A significant proportion (67.7%) of prescriptions included one or two antibiotics. Patients initially treated with ceftriaxone often required a transition to cefixime, while those started on cefoperazone-sulbactam were frequently switched to alternative agents, including amikacin, piperacillin-tazobactam, ceftazidime, levofloxacin, doxycycline, ceftriaxone, azithromycin, meropenem, or colistin. Prophylactic antibiotic use played a crucial role in reducing infection risks and enhancing patient outcomes, particularly in the nephrology department. In the respiratory department, 62.54% of antibiotic prescriptions were based on suspected infections. Cephalosporins were the most frequently prescribed antibiotics, with intravenous administration being predominant in patients with respiratory and nephrological conditions.

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