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Assessment Of Hospital Adherence To Antibiotic Policy And Its Impact On Rational Antibiotic Use And Antimicrobial Resistance

Syeda Nimrah Fatima[1*], Ayesha Saleem[2], Mohammed Yaseen Ahmed[3]
[1*]Assistant Professor of Pharmacy Practice, RBVRR Women's College of Pharmacy, Hyderabad, Telangana, INDIA.
[2]Assistant Professor of Pharmacy Practice, Shadan College of Pharmacy, Hyderabad, Telangana, INDIA.
[3]Pharmacist, Miomeds Pvt Ltd, Hyderabad, Telangana, INDIA.

Abstract
Introduction: *Antibiotics are essential in the management of infectious diseases caused by a wide range of microorganisms, which continue to be a significant cause of morbidity and mortality worldwide. To ensure their optimal and sustained effectiveness, national treatment guidelines have been developed to promote the rational use of antibiotics, including standardized approaches to common infections. These guidelines are periodically updated in response to emerging antimicrobial resistance patterns. Hospitals are expected to implement antibiotic policies based on these national standards to encourage appropriate prescribing practices. However, irrational and inappropriate antibiotic use persists as a major contributor to the development of antimicrobial resistance, posing a serious public health challenge. In this context, evaluating adherence to hospital antibiotic policies and their alignment with national guidelines is crucial. The present study aims to analyze the rational and judicious use of antibiotics within a hospital setting, assess the degree of adherence to the hospital's antibiotic policy, and explore its impact on the prevention of antimicrobial resistance. The study also seeks to compare the effectiveness of antibiotic monotherapy and combination therapy, and to evaluate the overall appropriateness of antibiotic prescriptions.*
Methodology: *A cross-sectional comparative study was conducted involving 686 subjects of both genders who were prescribed antibiotics. Neonates, pediatric patients, pregnant women, and tuberculosis cases were excluded. Data were collected using a structured form and analyzed using SPSS version 25.0. The Chi-square test was employed to evaluate statistical significance.*
Results: *Among the 686 prescriptions analyzed, 82% of antibiotics were prescribed appropriately according to National Treatment Guidelines. However, only 44.8% adhered to the hospital's antibiotic policy, while 54.9% of cases revealed a lack of relevant treatment guidelines within the hospital policy. A statistically significant therapeutic outcome was observed when prescriptions followed the National or hospital guidelines.*
Conclusion: *The study highlights a critical gap in hospital antibiotic policy—specifically, the absence of guidelines for several infectious conditions. This inadequacy can lead to inappropriate antibiotic use and increased antimicrobial resistance. It is imperative that hospital antibiotic policies be regularly reviewed and aligned with national treatment guidelines to promote rational antibiotic use and curb the emergence of resistance.*
Keywords: *Antibiotic policy, antimicrobial resistance, rational prescribing, monotherapy, combination therapy, hospital guidelines.*

INTRODUCTION

Antibiotics have revolutionized modern medicine since the discovery of penicillin in 1943, offering an effective means to treat a broad spectrum of infectious diseases caused by pathogenic microorganisms, which continue to be a leading cause of global morbidity and mortality(1,2). The golden era of antibiotic discovery from the 1940s to 1970s saw the development of multiple novel agents; however, this progress stagnated after the 1980s, leading to a discovery void that persists to this day(1). The irrational and widespread use of antibiotics has significantly contributed to the selection pressure on microbes, resulting in the emergence of both natural and acquired resistance, even to potent antibiotics such as carbapenems(1,3). The overuse and misuse of antibiotics in both community and hospital settings have accelerated this trend, making antimicrobial resistance (AMR) a critical public health challenge(4).

Drug resistance may be natural, due to intrinsic microbial characteristics, or acquired through mutations and horizontal gene transfer mechanisms such as conjugation, transformation, and transduction(5-9). This evolution of resistance mechanisms underlines the importance of understanding genetic and biochemical processes to

[1]*Assistant Professor of Pharmacy Practice, RBVRR Women's College of Pharmacy, Hyderabad, Telangana, INDIA.
[2]Assistant Professor of Pharmacy Practice, Shadan College of Pharmacy, Hyderabad, Telangana, INDIA.
[3]Pharmacist, Miomeds Pvt Ltd, Hyderabad, Telangana, INDIA.

inform more effective containment strategies[9]. Among the proposed solutions, combination antibiotic therapy has been implemented to enhance antimicrobial efficacy and delay resistance development. Although combination therapy can increase treatment costs and the risk of adverse drug reactions, it offers synergistic benefits, especially in polymicrobial infections or when resistance patterns are unknown[10,11].

For instance, β-lactam/β-lactamase inhibitor combinations, such as piperacillin–tazobactam and cefoperazone–sulbactam, have shown promising activity against resistant gram-negative organisms and are considered viable alternatives to carbapenems[12-14]. Nonetheless, careful evaluation of such combinations is necessary to ensure clinical efficacy and avoid redundancy. Empirical antibiotic therapy, typically initiated without microbiological confirmation, should be followed by definitive therapy guided by culture and sensitivity results to minimize toxicity and resistance emergence[15-19]. Similarly, prophylactic antibiotic use, especially in surgical settings, should be limited to appropriate indications, timing, and duration to avoid unnecessary exposure and resistance development[20-22].

Rational antibiotic prescribing, grounded in national and international treatment guidelines, plays a vital role in minimizing drug resistance, reducing healthcare costs, and improving patient outcomes[23,24]. Unfortunately, poor adherence to such guidelines—particularly in high-burden settings like intensive care units—contributes significantly to multidrug resistance and treatment failure[25,26]. The World Health Organization and national health agencies have advocated for the development and implementation of local hospital antibiotic policies aligned with national treatment guidelines to promote rational drug use[1,27].

Hospital antibiotic policies, typically developed by institutional infection control committees, aim to standardize prescribing practices, optimize therapeutic outcomes, and prevent resistance development within healthcare settings[27]. However, their success depends on active adherence by clinicians and the integration of antimicrobial stewardship programs (AMS) that monitor antibiotic use, evaluate prescribing behavior, and enhance awareness about AMR[28]. Several studies have highlighted the challenges in ensuring appropriate antibiotic use and adherence to guidelines in various clinical settings. In Kuwait, Aly et al. conducted a retrospective review of 2,232 patient records across nine government hospitals and found that only 30.4% of antibiotic prescriptions fully adhered to all aspects of the national policy, while 25% were given without indication, indicating low overall compliance[29]. In the context of febrile neutropenia, Paul et al. performed a systematic review and meta-analysis of randomized controlled trials and reported that cefepime monotherapy was associated with higher 30-day all-cause mortality compared to other β-lactams, whereas carbapenems had a greater incidence of adverse events, particularly pseudomembranous colitis; ceftazidime, piperacillin/tazobactam, imipenem/cilastatin, and meropenem were identified as suitable alternatives[30]. Adherence to surgical antibiotic prophylaxis guidelines was systematically evaluated by Gouvêa et al., who found substantial variability in compliance across 18 studies, with appropriate prophylaxis ranging from 0.3% to 84.5%, underscoring the need for stricter guideline adherence[31]. Additionally, Manges et al. demonstrated that approximately half of community-acquired urinary tract infections in women were caused by a multidrug-resistant Escherichia coli clonal group, with 22% showing resistance to trimethoprim–sulfamethoxazole, highlighting significant public health concerns[32].

The present study was conducted to assess the rational use of antibiotics, adherence to hospital antibiotic policy, and compare the therapeutic outcomes of monotherapy versus combination therapy, thereby contributing to the efforts in combating antimicrobial resistance through policy evaluation and evidence-based practice.

METHODOLOGY

AIMS:

The aim of this study is to analyze the rational and judicious use of antibiotics, adhering to the antibiotic policy of the hospital, to prevent the emergence of antimicrobial resistance

Objectives of the Study

The specific objectives of the study were:

1. To compare the effectiveness of antibiotic monotherapy versus combination therapy.
2. To assess hospital adherence to the institutional and/or national antibiotic policy.
3. To evaluate the appropriateness and effectiveness of prescribed antibiotic therapies.

STUDY DESIGN AND DURATION

This research employed a cross-sectional comparative study design to evaluate the rational and judicious use of antibiotics in accordance with the hospital antibiotic policy, with the broader aim of addressing the growing concern of antimicrobial resistance. The study was conducted over a six-month period from September 2017 to February 2018.

STUDY SETTING AND POPULATION

The study was carried out at Olive Hospital, located at Nanalnagar X Roads, Mehdipatnam, Hyderabad, Telangana, India. A total of 686 patients who were prescribed antibiotics and met the study's inclusion criteria were enrolled.

INCLUSION AND EXCLUSION CRITERIA

Patients of both genders who were prescribed antibiotics during the study period were included. However, neonates, pediatric patients, pregnant women, and individuals diagnosed with tuberculosis were excluded from the study to maintain uniformity in the clinical characteristics of the study population.

DATA COLLECTION PROCEDURE

Prior to data collection, ethical permission and authorization were obtained from the hospital's administrative authorities. A structured data collection form was developed to gather relevant patient information. The form captured details such as patient demographics, medical and medication history, laboratory investigation results, diagnoses, prescribed antibiotics, and progress notes. Only those prescriptions that met the inclusion criteria were considered, and data were recorded systematically and entered into a Microsoft Excel spreadsheet for analysis.

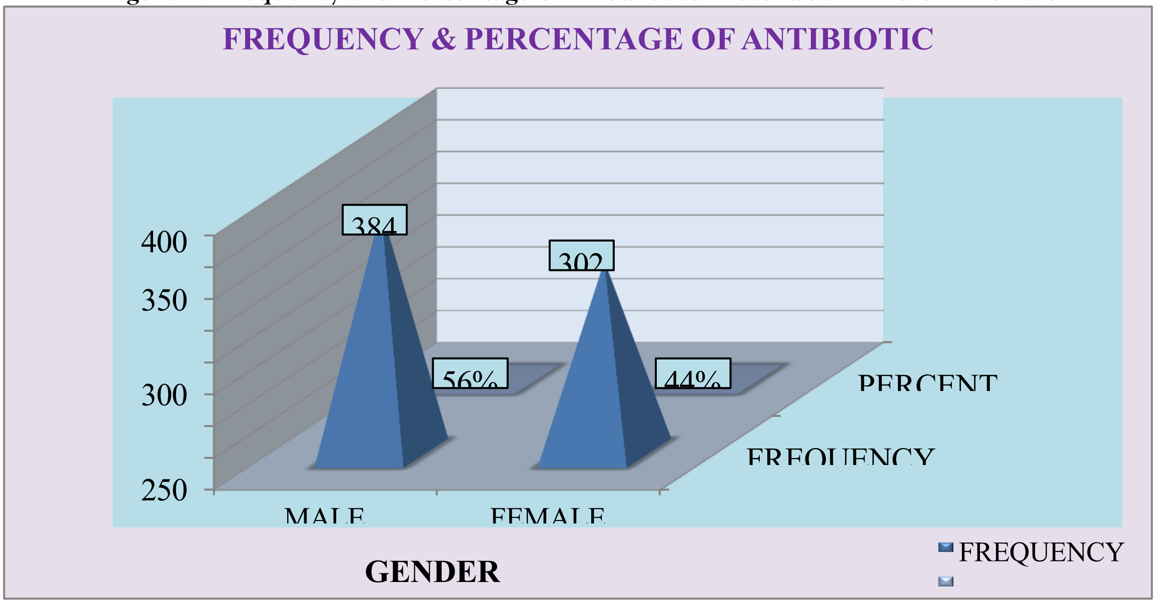
STATISTICAL ANALYSIS

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 25.0. The Chi-square test was used to evaluate associations between categorical variables such as gender, dosage form, type of antibiotic therapy (monotherapy vs. combination therapy), adherence to culture and sensitivity reports, departmental differences, and compliance with the hospital antibiotic policy. A p-value of less than 0.005 was considered statistically significant.

RESULTS AND DISCUSSION

The results were analyzed in accordance with the methodology described earlier. The effectiveness of therapy was classified into five categories: death, discharged against medical advice (DAMA), improved symptomatically (patients showing improvement as per laboratory investigations), symptomatically better (patients clinically stable), and symptoms persisting (+). The frequency, percentage, and therapeutic effectiveness were evaluated across different parameters to identify patterns in antibiotic use and treatment outcomes.

Figure 1: Frequency and Percentage of Antibiotics Prescribed in Male & Female



The graphical representation illustrates that the prescription rate of antibiotics was higher among males, with 384 cases accounting for 56% of the total, compared to 302 cases in females, representing 44%. This indicates a greater frequency of antibiotic use in male patients than in female patients.

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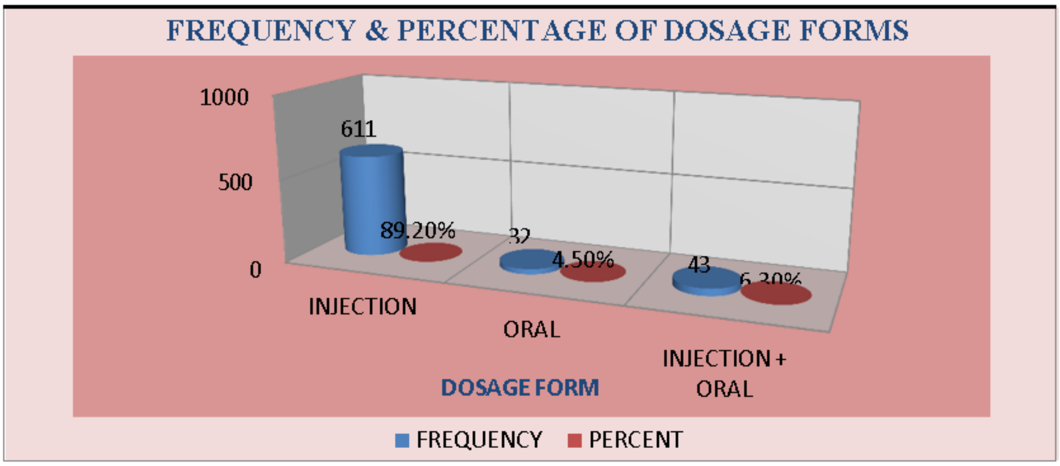
Table 1: Effectiveness of Therapy based on Gender

		EFFECTIVENESS OF THERAPY					Total
		DEAD	DISCHARGED AGAINST MEDICAL ADVICE	IMPROVING SYMPTOMATIC A LLY	SYMPTOMAT IC ALLY BETTER	SYMPTOMS +	
GENDER	MALE	1	6	151	216	9	**383**
	FEMAL E	0	4	132	158	8	**302**
Total		**1**	**10**	**283**	**374**	**18**	**686**

X2= 2.970 df=4 P-value= 0.563 Not statistically significant

Based on the data, the effectiveness of antibiotic therapy across gender showed that among male patients (n=383), 1 (0.26%) died, 6 (1.57%) were discharged against medical advice, 151 (39.43%) improved symptomatically, 216 (56.39%) were symptomatically better, and 9 (2.35%) continued to have symptoms. In females (n=302), none died, 4 (1.32%) were discharged against medical advice, 132 (43.71%) improved symptomatically, 158 (52.32%) were symptomatically better, and 8 (2.65%) continued to have symptoms. Although males showed a slightly higher proportion of "symptomatically better" outcomes, the difference between genders was not statistically significant (χ^2=2.970, df=4, p=0.563).

Figure 2: Frequency and Percentage of Dosage Forms



The graphical representation of dosage forms prescribed reveals that injections (IV route) were the most frequently used, with a frequency of 611 prescriptions, accounting for 89.20% of all cases. In contrast, oral formulations were prescribed in only 32 cases (4.50%), while a combination of injection and oral routes was used in 43 cases (6.30%). This indicates a predominant reliance on the injection form compared to other dosage forms.

Table 2: Effectiveness of Therapy Based on Dosage Form of Antibiotics

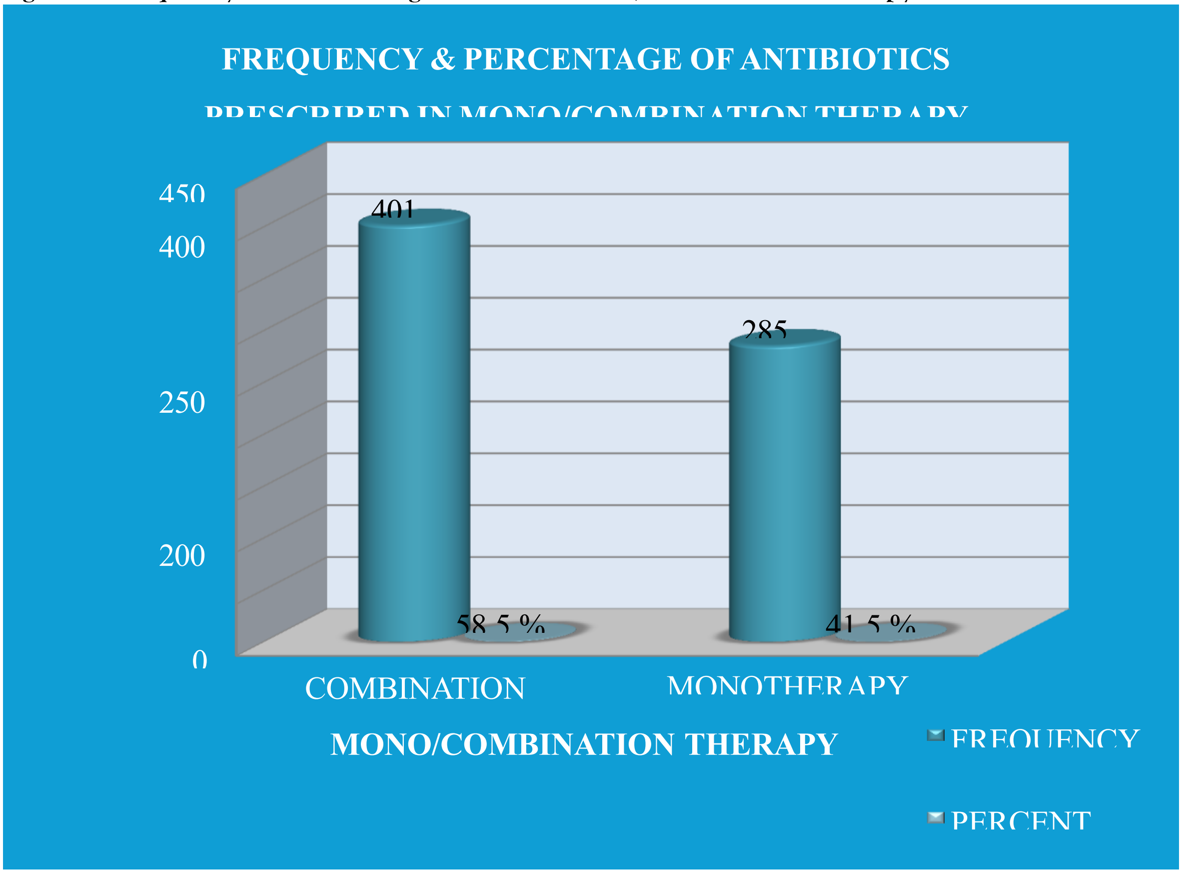
Crosstab							
Count	EFFECTIVENESS OF THERAPY						
	Dead		Discharged Against Medical Advice	Improving Symptomatically	Symptomaticall y Better	Symptoms +	**Total**
DOSAGE FORM OF ANTIBIOTIC	INJECTION	1	9	248	338	15	**611**
	ORAL		0	14	15	3	**31**

	INJECTION + ORAL	0	1	20	22	0	43
Total		1	10	282	375	18	686

X2= 4.819 df=8 P-value= 0.777 Not statistically significant.

Table 2 presents the effectiveness of antibiotic therapy based on the dosage form prescribed. Among patients receiving injections, 338 were categorized as “symptomatically better” and 248 showed symptomatic improvement, while smaller numbers were discharged against medical advice (9), had persistent symptoms (15), or died (1). For oral therapy, 15 patients were “symptomatically better” and 14 showed improvement, with 3 reporting persistent symptoms and none recorded as deceased. The combination of injection and oral therapy resulted in 22 patients being “symptomatically better” and 20 showing improvement, with one case discharged against medical advice and no deaths. Statistical analysis (χ^2 = 4.819, df = 8, p = 0.777) indicated that these differences were not statistically significant.

Figure 3: Frequency And Percentage Based On Mono/Combination Therapy Of Antibiotics



The graphical representation of antibiotic prescribing patterns demonstrates that combination therapy was more frequently utilized, accounting for 401 prescriptions (58.5%), compared to monotherapy, which was prescribed in 285 cases (41.5%). This indicates a predominant preference for combination therapy over monotherapy in the study population.

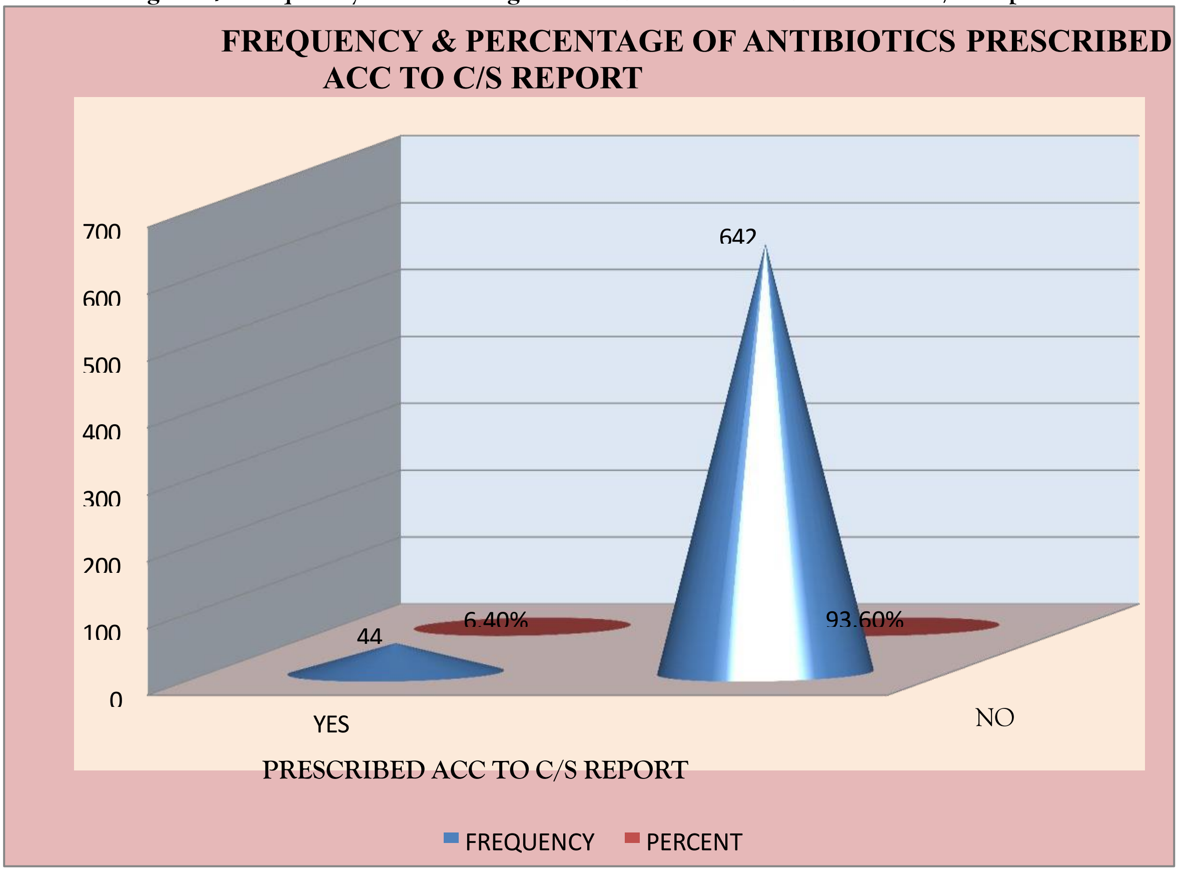
Table 3: Effectiveness of Therapy Based on Mono/Combination Therapy of Antibiotics

Crosstab							
Count	EFFECTIVENESS OF THERAPY					**TOTA L**	
		Dead	Discharged Against Medical Advice	Improving Symptomatica l ly	Symptomatically Better	Symptoms +	
Mono/ Combina tion Therapy	Combination Therapy	1	4	171	214	11	**401**
	Mono Therapy	0	6	112	161	6	285
Total		1	10	283	375	17	686

X2= 3.847 df=4 P-value= 0.427 Not statistically significant.

The table presents the effectiveness of therapy in relation to mono- and combination antibiotic regimens. Among patients receiving combination therapy (n=401), 214 were categorized as "symptomatically better" and 171 showed symptomatic improvement, while 4 were discharged against medical advice, 11 continued to have symptoms, and 1 patient died. In the monotherapy group (n=285), 161 were "symptomatically better" and 112 showed improvement, with 6 discharged against medical advice, 6 reporting persistent symptoms, and no deaths recorded. Statistical analysis (χ^2 = 3.847, df = 4, p = 0.427) indicated no significant difference in treatment outcomes between monotherapy and combination therapy groups.

Figure 4: Frequency & Percentage of Antibiotics Prescribed Acc to C/S Report



The graphical representation illustrates the frequency and percentage of antibiotics prescribed based on culture and sensitivity (C/S) reports. It shows that only 44 prescriptions (6.4%) were aligned with C/S reports, whereas the majority, 642 prescriptions (93.6%), were issued without reference to C/S findings. This indicates a predominant reliance on empirical prescribing rather than culture-guided therapy.

Table 4: Effectiveness of Therapy Based on Antibiotics Prescribed ACC to C/S Report

Crosstab							
Count		EFFECTIVENESS OF THERAPY					**Total**
		Dead	Discharged Against Medical Advice	Improving Symptomatically	Symptomatically Better	Symptoms +	
Antibiotic Prescribed Acc To C/S Report	YES	0	0	26	15	3	**44**
	NO	1	10	257	360	14	**642**
Total		**1**	**10**	**283**	**375**	**17**	**686**

X^2= 11.678, df=4, P-value= 0.020 statistically significant

Table 4 summarizes the effectiveness of therapy based on whether antibiotics were prescribed according to culture and sensitivity (C/S) reports. Among prescriptions guided by C/S results (n=44), 26 patients showed symptomatic improvement, 15 were symptomatically better, and 3 continued to have symptoms, with no deaths or discharges against medical advice recorded. In contrast, among prescriptions not based on C/S reports (n=642), 257 patients improved symptomatically, 360 were symptomatically better, 14 had persistent symptoms, 10 were discharged against medical advice, and 1 patient died. Statistical analysis revealed a significant difference in therapeutic effectiveness between the two groups (χ^2 = 11.678, df = 4, p = 0.020), indicating that the prescribing approach, whether guided by C/S reports or empirical, was significantly associated with treatment outcomes.

Figure 5: Frequency and Percentage of Antibiotics Prescribed in Departments

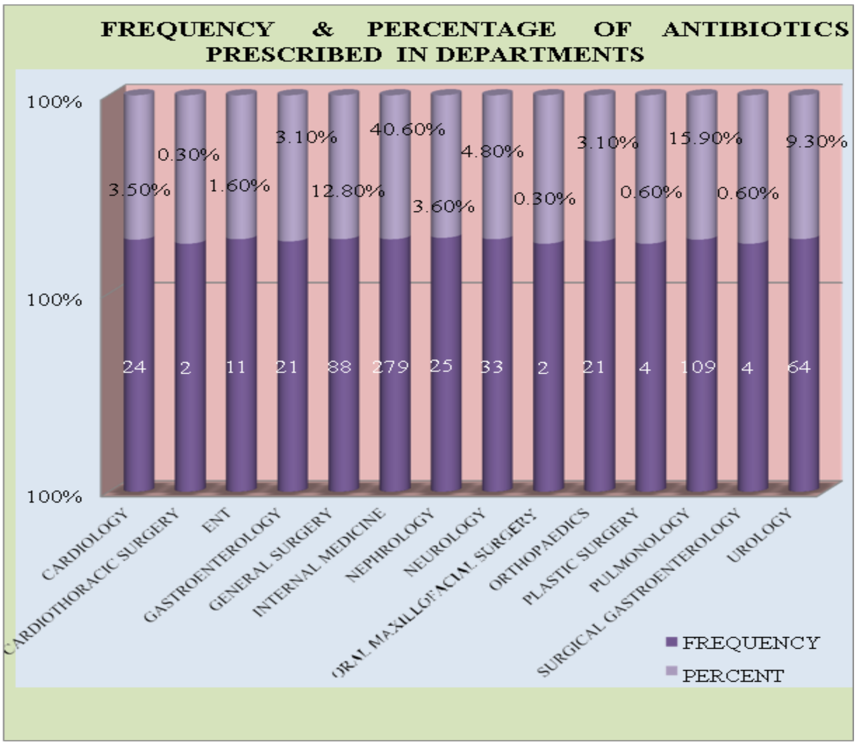


Figure 5 illustrates the frequency and percentage of antibiotics prescribed across various hospital departments. The highest proportion of prescriptions was observed in the Internal Medicine department, accounting for 279 cases (40.6%), followed by Pulmonology with 109 cases (15.9%) and Urology with 64 cases (9.3%). General Surgery recorded 88 cases (12.8%), while Neurology accounted for 33 cases (4.8%) and Orthopaedics for 21 cases (3.1%). Other departments, including Cardiology (24; 3.5%), Gastroenterology (11; 1.6%), ENT (21; 3.1%), and Surgical Gastroenterology (4; 0.6%), had lower prescription rates. Cardio-thoracic Surgery, Oral & Maxillofacial Surgery, and Plastic Surgery had the lowest frequencies, each contributing less than 1% of the total prescriptions. This distribution highlights a concentrated antibiotic usage in Internal Medicine and Pulmonology, with markedly lower prescribing in surgical subspecialties.

Table 5: Effectiveness of Therapy Based on Antibiotics Prescribed in Departments

DEPT * EFFECTIVENESS OF THERAPY Cross tabulation

Count

		EFFECTIVENESS OF THERAPY					Total
		Dead	Discharged Against Medical Advice	Improving Symptomatically	Symptomatically Better	Symptoms +	
DEPT	CARDIOLOGY	0	0	18	6	0	**24**
	CARDIOTHORACIC SURGERY	0	0	2	0	0	**2**
	ENT	0	0	3	8	0	**11**
	GASTROENTEROLOGY	0	0	5	15	1	**21**
	GENERAL SURGERY	0	2	28	58	0	**88**

	INTERNAL MEDICINE	1	4	104	162	8	**279**
	NEPHROLOGY	0	0	16	7	2	**25**
	NEUROLOGY	0	1	21	5	5	**33**
	ORAL MAXILLOFACIAL SURGERY	0	0	0	2	0	**2**
	ORTHOPAEDICS	0	0	7	13	1	**21**
	PLASTIC SURGERY	0	0	2	2	0	**4**
	PULMONOLOGY	0	2	62	45	0	**109**
	SURGICAL GASTROENTEROLOGY	0	0	1	3		**4**
	UROLOGY	0	1	14	49		**64**
Total		**1**	**10**	**283**	**375**		**686**

X^2= 112.359, df=52, p-value= 0.000, significant

Table 5 presents the distribution of therapy outcomes across various hospital departments based on antibiotics prescribed. Outcomes measured include patient status categorized as Dead, Discharged Against Medical Advice, Improving Symptomatically, Symptomatically Better, and Symptoms Present. A total of 686 cases were analyzed, showing that antibiotics prescribed by different departments resulted in varying therapeutic effectiveness. Notably, the Internal Medicine department demonstrated the highest number of patients classified as "Symptomatically Better" (162 patients) compared to other departments. Additionally, this department also had more patients with persistent symptoms ("Symptoms +") relative to others.

Statistical analysis using the Chi-square test (X^2 = 112.359, df = 52, p = 0.000) indicates a highly significant association between the department prescribing antibiotics and the effectiveness of therapy. Since the p-value is less than 0.05, the differences in therapeutic outcomes among departments are statistically significant. In summary, the data suggest that the Department of Internal Medicine shows a comparatively better therapeutic response among patients treated with antibiotics, underscoring potential department-specific factors influencing treatment success.

The graphical representation illustrates the distribution of therapy outcomes based on antibiotic treatment effectiveness. The majority of patients, 54.60% (n = 375), showed significant improvement and were classified as "Symptomatically Better." Following this, 41.20% (n = 283) were "Improving Symptomatically," indicating ongoing recovery. A smaller proportion of patients, 2.50% (n = 17), continued to exhibit symptoms ("Symptoms +"). The lowest percentages were observed for adverse outcomes, with only 1.50% (n = 10) discharged against medical advice and a minimal mortality rate of 0.30% (n = 1). Overall, the data highlight a predominantly positive response to antibiotic therapy among the patients studied.

Figure 6: Frequency and Percentage of Effectiveness of Therapy

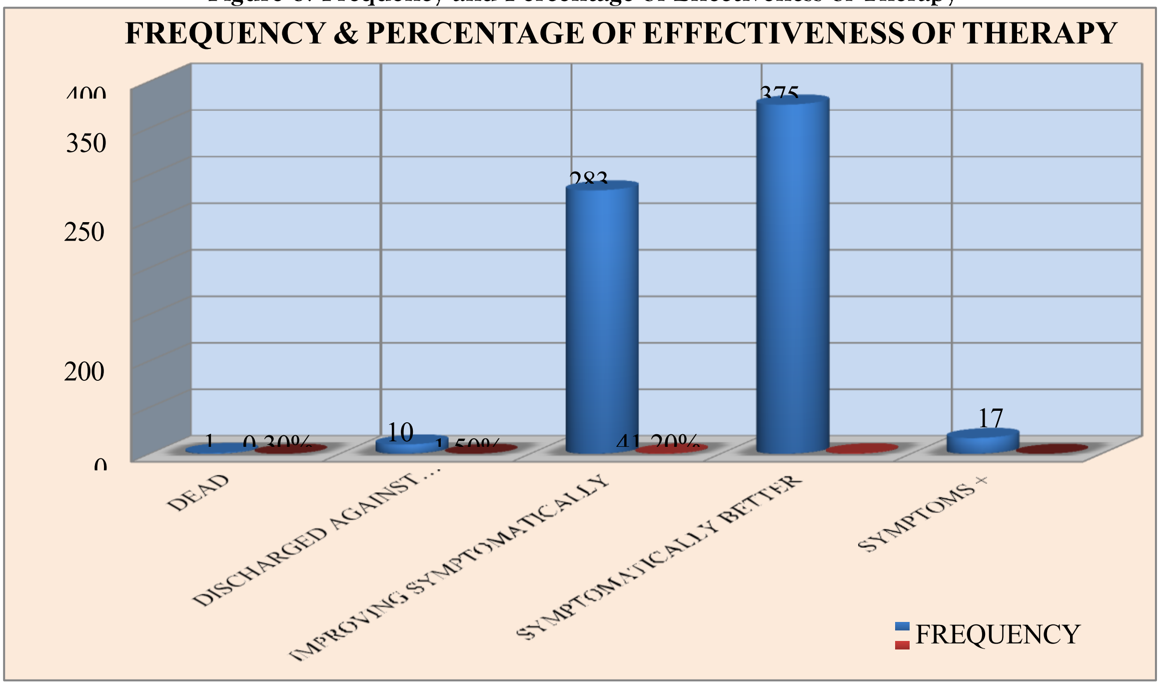


Table 6: Effectiveness of Therapy Based on Indicated Therapy

		EFFECTIVENESS OF THERAPY					TOT AL
		Dead	Discharged Against Medical Advice	Improving Symptomatically	Symptomatically Better	Symptoms +	
Therapy	Empiric	0	3	62	96	7	**168**
	Definitive	1	6	171	168	8	**354**
	Prophylactic	0	2	50	110	2	**164**
Total		1	10	283	374	17	686

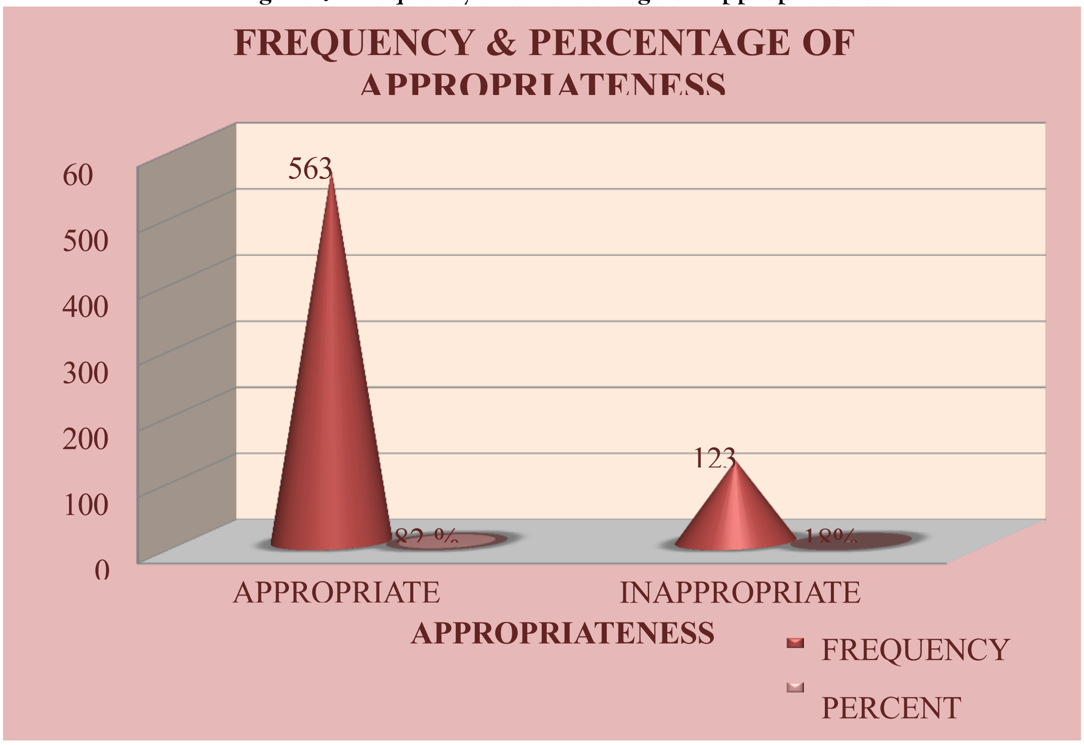
X^2= 22.178 df=8 P-value= 0.005 statistically significant

The table compares the therapeutic outcomes of three types of antibiotic therapy: empiric, definitive, and prophylactic, across five clinical outcome categories: Dead, Discharged Against Medical Advice, Improving Symptomatically, Symptomatically Better, and Symptoms Present.

A total of 686 cases were analyzed. Definitive therapy resulted in the highest number of patients classified as *Symptomatically Better* (n = 168), followed by prophylactic therapy (n = 110) and empiric therapy (n = 96). Similarly, definitive therapy also had the highest overall case count (n = 354), suggesting its more frequent and effective application.

Statistical analysis using the Chi-square test (X^2 = 22.178, df = 8, p = 0.005) indicated a significant association between the type of antibiotic therapy prescribed and therapeutic outcomes. Since the p-value is less than 0.05, the differences observed in effectiveness among empiric, definitive, and prophylactic therapies are statistically significant.

Figure 7: Frequency and Percentage of Appropriateness



This figure illustrates the appropriateness of antibiotic prescriptions based on adherence to national treatment guidelines. The analysis shows that the majority of prescriptions, 82% (n = 563), were appropriate, while 18% (n = 123) were inappropriate. These findings indicate a high level of compliance with established prescribing standards, though a notable proportion still deviates from recommended guidelines.

Table 7: Effectiveness of Therapy Based on Appropriateness of Therapy

Crosstab								
Count		EFFECTIVENESS OF THERAPY						**TOTAL**
		Dead	Discharged Against Medical Advice	Improving Symptomatically	Symptomatically Better	Symptoms +		
Appropriateness	Appropriate	1	9	232	310	11		**563**
	Inappropriate	0	1	51	65	6		**123**
Total		**1**	**10**	**283**	**375**	**17**		**686**

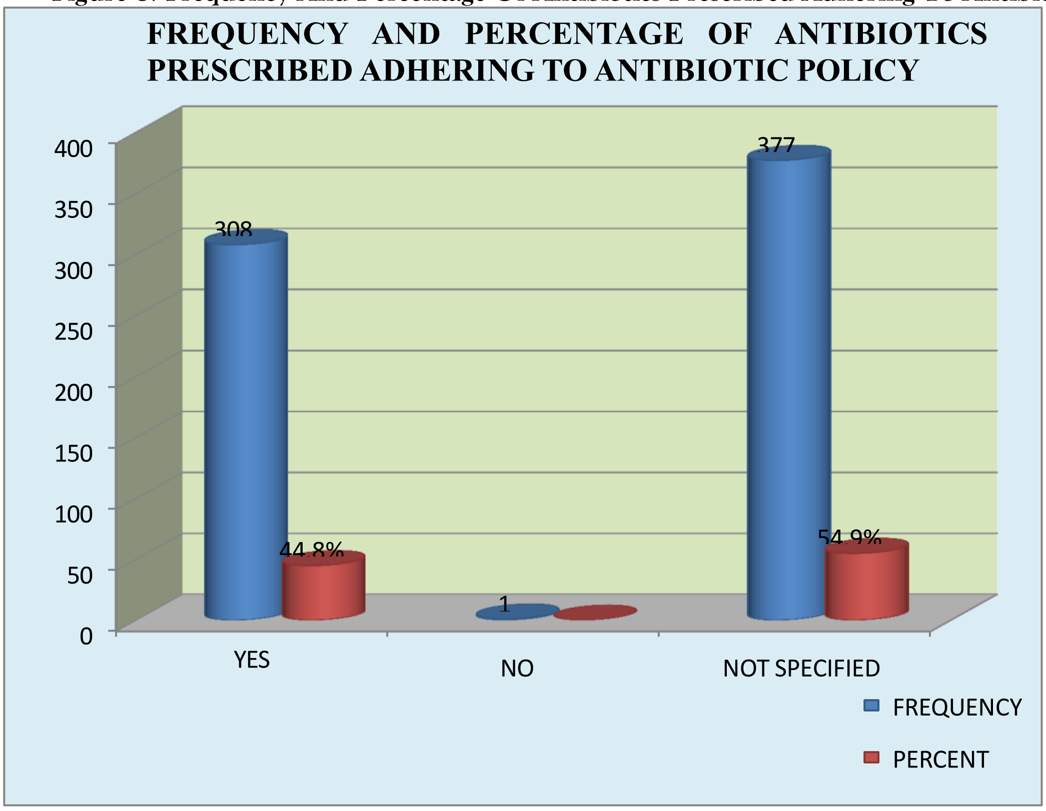
X^2= 5.366 df=4 P-value= 0.252 Not statistically significant

This table compares the effectiveness of therapy with the appropriateness of antibiotic prescriptions, where adherence to national treatment guidelines was classified as *appropriate* and deviation from them as *inappropriate*. Out of 686 cases, 563 (82%) prescriptions were appropriate, and 123 (18%) were inappropriate.

Among the appropriately prescribed antibiotics, the majority of patients were *Symptomatically Better* (n = 310) or *Improving Symptomatically* (n = 232), with very few cases resulting in persistent symptoms (n = 11), discharge against medical advice (n = 9), or death (n = 1). In the inappropriate prescription group, 65 patients were *Symptomatically Better* and 51 were *Improving Symptomatically*, with small numbers in other outcome categories.

These results indicate that a higher proportion of patients receiving appropriately prescribed antibiotics experienced favorable therapeutic outcomes compared to those receiving inappropriate prescriptions.

Figure 8: Frequency And Percentage Of Antibiotics Prescribed Adhering To Antibiotic Policy



This figure illustrates adherence to the hospital's antibiotic policy. Out of all prescriptions, 44.8% (n = 308) adhered to the policy, while only 0.1% (n = 1) were prescribed in direct violation of the policy. In 54.9% (n = 377) of cases, the policy adherence status was *not specified*, indicating a lack of treatment guideline documentation for these prescriptions.

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Table 8: Effectiveness of Therapy Based on Antibiotics Prescribed Adhering to Antibiotic Policy

ADHERING TO ANTIBIOTIC POLICY (YES/NO) * CODING OF EFFECTIVENESS OF THERAPY							
			CODING OF THE EFFECTIVENESS OF THERAPY				**Tot al**
	Dead	Discharged Against Medical Advice		Improving Symptomatically	Symptomatically Better	Symptom S+	
Adhering To Antibiotic Policy (Yes/No)	YES	1	6	146	149	6	**308**
	NO	0	0	1	0	0	**1**
	Not 'S"	0	4	136	226	11	**377**
Total		**1**	**10**	**283**	**375**	**17**	**686**

$X^2 = 12.434$ d.f= 8 p= 0.133 not significant.

This table compares therapeutic outcomes with adherence to the hospital's antibiotic policy. Of the 686 total cases, 308 prescriptions (44.8%) adhered to the policy, 1 case (0.1%) did not adhere, and 377 cases (54.9%) had no specified policy adherence status.

Among the policy-adherent prescriptions, the majority of patients were classified as *Symptomatically Better* (n = 149) or *Improving Symptomatically* (n = 146), with few cases resulting in persistent symptoms (n = 6), discharge against medical advice (n = 6), or death (n = 1). The single non-adherent prescription was associated with a patient who was *Improving Symptomatically*. In cases where policy adherence was not specified, 226 patients were *Symptomatically Better,* and 136 were *Improving Symptomatically*.

The Chi-square test ($X^2 = 12.434$, df = 8, p = 0.133) indicates that the association between antibiotic policy adherence and therapy effectiveness was not statistically significant. This suggests that, while policy-adherent prescriptions demonstrated favorable outcomes, similar results were also observed in cases without specified policy adherence.

DISCUSION

Multiple comparative studies have highlighted gaps in antibiotic prescribing practices when measured against national treatment guidelines and hospital antibiotic policies. Kraus et al., (2017) reported low adherence (21.61%) to national guidelines, with a large proportion of prescriptions being inappropriate (74.82%)[33]. In contrast, our study demonstrated a much higher adherence rate, with 82% (563/686) of prescriptions appropriate according to national treatment guidelines and only 18% (123) inappropriate, reinforcing the importance of guideline adherence in improving antibiotic appropriateness.

Similarly, Aly et al., (2012) found that only 52.7% of prescriptions adhered to hospital antibiotic policy, emphasizing the need for improved prescribing practices[34]. In our study, 44.8% (308) of prescriptions adhered to hospital policy, 0.1% (1) did not, and 54.9% (377) involved antibiotics not specified within the policy. This underscores the need to expand and regularly revise hospital antibiotic policies to cover more clinical scenarios and to ensure better adherence, which is essential for preventing resistance and minimizing adverse effects.

When therapy types were compared, Shahzad et al., (2014) observed that empiric therapy dominated over prophylactic and definitive therapy, potentially increasing resistance risk[35]. In contrast, our findings showed definitive therapy was prescribed more often than empiric or prophylactic therapy and achieved the highest rate of symptomatically better outcomes, suggesting that definitive therapy, when feasible, can yield superior results.

Department-wise prescription patterns in our study were compared with those reported by Remesh et al., (2013). While their analysis covered six departments, our evaluation spanned 14, with Internal Medicine accounting for the largest proportion (40.6%) and showing both the highest number of symptomatically better outcomes and more patients with persistent symptoms than other departments[36]. This highlights the importance of targeted stewardship interventions in high-prescription areas.

Regarding culture and sensitivity testing, Atif et al., (2017) found it was rarely performed (0.24%)[37]. Our study revealed a modest improvement at 6.4%, but the rate remains suboptimal. Increasing reliance on culture-guided therapy could further enhance antibiotic appropriateness.

Rodrigo et al., (2013) reported higher mortality rates with combination therapy compared to monotherapy[38]. In our data, combination therapy was more common (58.5% vs 41.5%) and slightly more effective, though it also accounted for the only recorded death (0.3%). This suggests that while combination therapy may offer therapeutic benefits, its risks, including adverse effects, must be carefully weighed.

Mertz et al., (2008) observed high compliance (78.5%) with national guidelines in intravenous antibiotic use[39]. Similarly, our study found appropriate dosage form prescriptions in 82% (563/686) of patients, with noncompliance largely responsible for inappropriateness, indicating the need for continuous monitoring.

Gender-based prescribing patterns also varied across studies. Anderson et al., (2008) suggested females may be more susceptible to adverse drug reactions due to physiological differences[40], while Schröder et al,. (2016) found higher antibiotic use in females[41]. In contrast, our study showed a higher prescription rate in males (56%) than in females (44%), a difference that warrants further investigation into whether it is driven by disease burden, resistance patterns, or prescriber habits.

Overall, our findings indicate that adherence to treatment guidelines in both national and hospital-specific settings significantly improves antibiotic appropriateness. Expanding hospital antibiotic policies, encouraging definitive therapy where possible, increasing culture-guided prescribing, and strengthening antimicrobial stewardship programs across all departments are essential steps toward optimizing antibiotic use, minimizing resistance, and improving patient outcomes.

CONCLUSION

Antibiotics are among the most frequently prescribed medications in hospital settings for the management of infectious diseases. Their appropriate and judicious use is crucial to achieving optimal therapeutic outcomes and to curbing the growing threat of antibiotic resistance. Strengthening antibiotic stewardship programs plays a vital role in ensuring the rational use of these drugs by promoting adherence to evidence-based treatment protocols.

Effective antibiotic therapy is best achieved when unnecessary or inappropriate prescriptions are minimized, which can be accomplished through strict adherence to National Treatment Guidelines (NTGs) and the development and implementation of robust, hospital-specific antibiotic policies.

In our study, 82% of antibiotics were prescribed appropriately in accordance with NTGs, while only 44.8% adhered to the hospital's own antibiotic policy. Notably, 54.9% of the hospital antibiotic policy lacked clear treatment guidelines for specific infectious diseases. This gap in policy not only increases the likelihood of inappropriate antibiotic use but also heightens the risk of antibiotic resistance and adverse drug reactions.

To enhance antibiotic use and improve patient outcomes, it is imperative that hospital antibiotic policies be updated to align fully with NTGs. Furthermore, regular audits of adherence to these policies should be conducted to monitor compliance, identify gaps, and implement corrective measures. Such steps are essential to safeguard the effectiveness of antibiotics for current and future generations.

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