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Original Research Article

Clinicians' Perspectives on the Role of Faropenem in Recurrent and Multidrug-Resistant Bacterial Infections in Adults

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Abstract: ***Objective*:** To assess clinicians' perspectives on the role of faropenem in the management of recurrent and multidrug-resistant (MDR) bacterial infections in adults, with particular emphasis on its effectiveness, safety, and tolerability. ***Methods*:** This cross-sectional study was conducted among clinicians across India using a structured 23-item questionnaire to assess the perceived effectiveness, tolerability, and therapeutic outcomes of faropenem in recurrent and MDR bacterial infections. Responses were analyzed descriptively using frequencies and percentages, and the results were presented using Microsoft Excel. ***Results*:** Among the 91 participants, nearly 76% of clinicians identified *Streptococcus pneumoniae* as the most common causative organism of respiratory infections. About 47% of respondents reported occasionally encountering MDR organisms in routine practice. Broad-spectrum antimicrobial coverage was considered the most important factor influencing antibiotic selection by approximately 46% of clinicians. Around 46% of respondents also reported frequently performing culture and sensitivity testing prior to antibiotic initiation. More than half (56.04%) of the participants preferred faropenem for 5–7 days in adult infections. Nearly 48% preferred faropenem in 11–25% of patients with urinary tract infections (UTIs), while about 46% recommended it in 11–25% of patients with skin and soft tissue infections (SSTIs). Additionally, around 41% of clinicians reported regularly monitoring patients for adverse effects or complications during faropenem therapy. ***Conclusion*:** The survey findings indicate that faropenem is widely used in the management of adult bacterial infections, particularly UTIs and SSTIs. Broad-spectrum antimicrobial coverage and culture-based decision-making strongly influence antibiotic selection, while *Streptococcus pneumoniae* remains the predominant respiratory pathogen.

Keywords: Faropenem, Bacterial Infections, UTIs, SSTIs, Antibiotic Stewardship, *Streptococcus Pneumoniae*.

INTRODUCTION

Recurrent bacterial infections and infections caused by multidrug-resistant (MDR) organisms represent a major global public health challenge, contributing significantly to increased morbidity, mortality, healthcare expenditure, and prolonged hospital stays. The emergence and rapid spread of antimicrobial resistance have substantially reduced the effectiveness of conventional antibiotics, particularly in the management of urinary tract infections (UTIs), respiratory tract infections (RTIs), skin and soft tissue infections (SSTIs), and post-surgical infections. According to the Global Burden of Bacterial Antimicrobial Resistance study, antimicrobial resistance was directly associated with approximately 1.27 million deaths globally, highlighting the growing burden of resistant bacterial infections worldwide [1].

India carries a particularly high burden of antimicrobial resistance due to widespread antibiotic consumption, inappropriate prescribing practices, over-the-counter availability of antibiotics, and increasing prevalence of extended-spectrum beta-lactamase (ESBL)-producing and carbapenem-resistant organisms. Several Indian surveillance studies have reported high resistance rates among commonly isolated pathogens such as *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*, especially in recurrent urinary and RTIs [2, 3]. The increasing incidence of MDR pathogens has complicated empirical antibiotic selection and necessitated the use of

effective oral agents with broad-spectrum antimicrobial activity.

Faropenem is an orally active penem antibiotic with broad-spectrum bactericidal activity against Gram-positive, Gram-negative, aerobic, and anaerobic bacteria, including several beta-lactamase-producing organisms. Similar to other beta-lactam antibiotics, faropenem exerts its antimicrobial effect by inhibiting bacterial cell wall synthesis through binding to penicillin-binding proteins (PBPs), resulting in disruption of peptidoglycan synthesis and bacterial cell death [4]. Faropenem has demonstrated stability against many beta-lactamases and has shown favorable activity against common respiratory and urinary pathogens, including ESBL-producing organisms. Owing to its oral bioavailability, broad-spectrum coverage, and favorable safety profile, faropenem has increasingly been utilized in the outpatient management of recurrent and MDR bacterial infections [5].

Despite the increasing clinical use of faropenem in India, limited data are available regarding clinicians' perspectives on its usage patterns, therapeutic effectiveness, safety, and tolerability in routine practice. Therefore, the present survey was conducted to assess clinicians' perspectives on the role of faropenem in the management of recurrent and MDR bacterial infections in adults, with particular emphasis on its effectiveness safety, and tolerability.

METHODOLOGY

A cross-sectional study was carried out among clinicians involved in the management of recurrent and MDR bacterial infections in adults in the major Indian cities from June 2025 to December 2025. The study was performed in accordance with Bangalore Ethics, an Independent Ethics Committee (ECR/355/Indt/KA/2022), which was recognized by the Indian Regulatory Authority, the Drug Controller General of India.

An invitation was sent to leading clinicians in managing recurrent and MDR bacterial infections in adults in the month of March 2025 for participation in this Indian survey. About 91 clinicians from major cities of all Indian states, representing the geographical distribution, shared their willingness to participate and provide necessary data.

The questionnaire booklet titled the FROCE (Faropenem Outcomes in Resistant Infections: Expert Perspective Study) was sent to the clinicians who were interested in participating in the survey. The study questionnaire comprising 23-items questions focused on clinical use, usage patterns, effectiveness, safety, tolerability, and treatment outcomes associated with faropenem in routine practice. The questionnaire focused on clinicians' perspectives regarding the role of faropenem in the management of recurrent bacterial infections, including urinary tract infections, RTIs, SSTIs, and post-surgical infections caused by resistant organisms. It also evaluated commonly encountered MDR pathogens, frequency of recurrent infections, culture and sensitivity testing practices, duration of therapy, treatment response, and factors influencing the selection of faropenem over other antimicrobial agents.

Additionally, the survey assessed clinicians' perceptions of faropenem with respect to symptom improvement, reduction in recurrence, patient compliance, gastrointestinal tolerability, and adverse events observed during therapy. Opinion regarding empirical versus culture-guided prescribing practices and the role of faropenem in outpatient antimicrobial management were also explored.

Reliability, as determined by a split-half test (coefficient alpha), was adequate but should be improved in future versions of the questionnaire. A study of criterion validity was undertaken to test the questionnaire and to develop methods of testing the validity of measures of Physicians' Perspectives. However, the extraneous variables in this include the clinician's experience, usage of the newer drugs, etc. The two criteria used were the doctors' perspectives from the clinical practice and the assessment of an external assessor and statistician. Clinicians had the option to skip questions as desired and were instructed to complete the survey independently, without peer consultation. Before participating in the survey, all respondents provided written informed consent.

Statistical Analysis

Survey responses were analyzed using descriptive statistical methods. Categorical variables were summarized as frequencies and percentages. Data were presented in the form of tables and figures prepared using Microsoft Excel (version 2409, build 16.0.18025.20030).

RESULTS

A total of 91 participants were included in the current survey. More than half (68.13%) of the clinicians reported that 11–25% of adult patients seen per month had suspected or confirmed bacterial infections. About 36% of participants identified RTIs as the most commonly observed infections among patients. Approximately 76% of participants reported *S. pneumoniae* as the most common causative organism of respiratory infections (Table 1). Around 47% of participants reported occasionally encountering MDR organisms in clinical practice (Fig. 1).

Table 1: Distribution of responses on most common causative organism for respiratory infections in clinical experience

Organisms	Response rate (n = 91)
Streptococcus pneumoniae	75.82%
Haemophilus influenzae	6.59%
Klebsiella pneumoniae	4.4%
Escherichia coli	10.99%
All of the above	2.2%

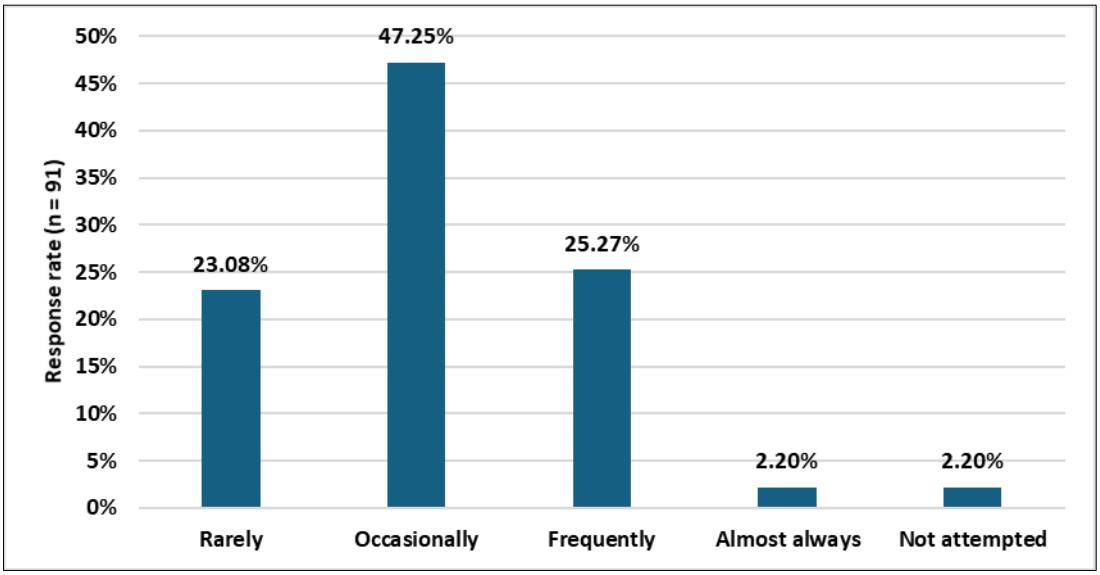

Figure 1: Distribution of responses on frequency of MDR organisms in clinical practice

Around 46% of participants reported broad-spectrum coverage as the most important factor considered while selecting antibiotics (Table 2). Approximately 46% of participants reported often performing culture and sensitivity testing before initiating antibiotic therapy (Table 3). Nearly 68% of participants reported using faropenem as an oral antibiotic. More than half (57.14%) of the respondents occasionally experienced treatment failure with oral antibiotics. About 71% of participants rated faropenem as having excellent tolerability. Approximately 89% of participants considered faropenem to be highly effective in recurrent infections. Around 47% of participants reported a similar response when comparing faropenem with meropenem or biapenem in adults. More than half (56.04%) of the participants prescribed faropenem for 5–7 days in adult infections (Fig. 2).

Table 2: Distribution of responses on most considered factors while selecting antibiotics

Factors	Response rate (n = 91)
Culture report	40.66%
Local resistance pattern	5.49%
Broad-spectrum coverage	46.15%
Patient affordability	0%
All of the above	5.49%
Not attempted	2.2%

Table 3: Distribution of responses on frequency of performing culture and sensitivity tests before starting antibiotics

Frequency	Response rate (n = 91)
Always	30.77%
Often	46.15%
Rarely	19.78%
Never	1.1%
Not attempted	2.2%

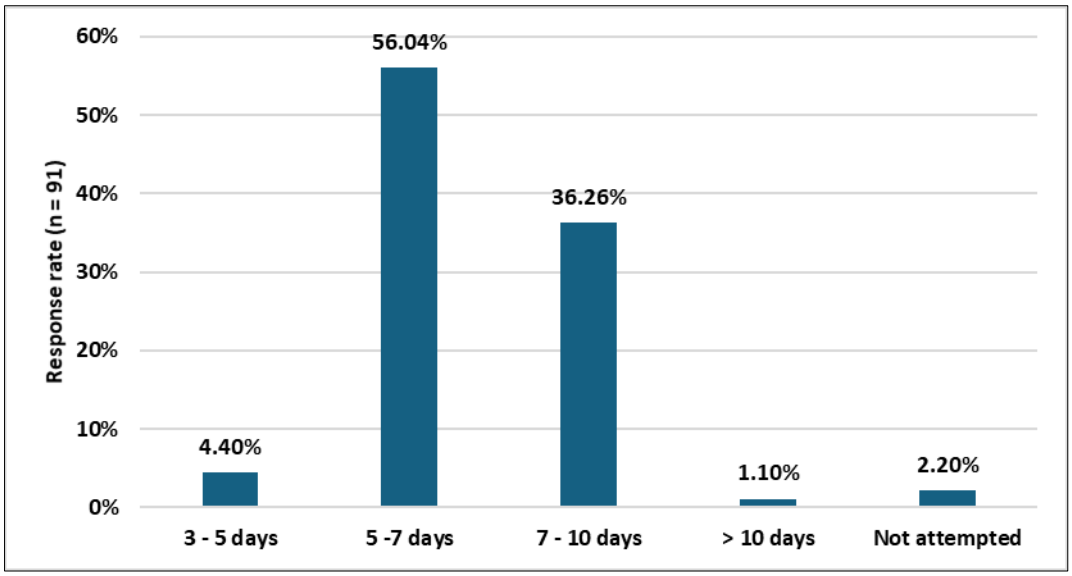

Figure 2: Distribution of responses on number of days faropenem recommended in adult infections

More than 46% of participants suggested that additional Indian studies are required to further evaluate the use of faropenem. Approximately 45% of participants recommended faropenem for adult patients with recurrent and/or resistant SSTIs. About 47% of respondents identified broader-spectrum activity compared with penicillins and cephalosporins as the key feature of faropenem. Around 46% of clinicians reported initiating faropenem as step-down therapy following intravenous antibiotics in routine clinical practice. Nearly half (48.35%) of the clinicians preferred faropenem in 11–25% of patients with UTIs (Table 4). Similarly, around 46% of participants reported recommending faropenem in 11–25% of patients with SSTIs (Fig. 3).

Table 4: Distribution of responses on percentage of patients with UTIs preferred faropenem

Percentage (%)	Response rate (n = 91)
<10	16.48%
11-25	48.35%
26-50	28.57%
51-75	4.4%
Not attempted	2.2%

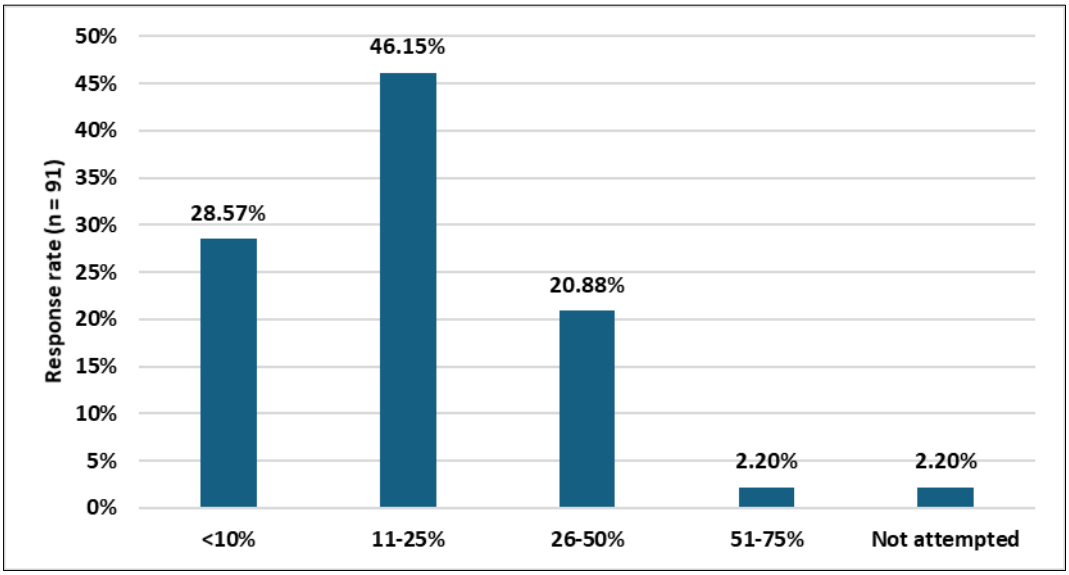

Figure 3: Distribution of responses on preference of faropenem on patients with SSTIs in clinical practice

According to 47% of clinicians, faropenem is frequently preferred in patients with post-surgical infections, such as deep incisional surgical site infections (SSIs) or organ/space SSIs, in routine clinical practice.

Around 41% of clinicians reported regularly monitoring patients for potential side effects or complications associated with faropenem therapy. Most of the participants (93.41%) reported no adverse drug reactions associated with faropenem. Additionally, 30% of participants reported marked improvement in clinical outcomes with faropenem on a 5-point global improvement scale.

DISCUSSION

The present nationwide survey highlights the growing clinical burden of recurrent and MDR bacterial infections in adult practice across India. Nearly half of the clinicians reported encountering MDR organisms in routine clinical settings, reflecting the increasing challenge posed by antimicrobial resistance in the management of common infections such as UTIs, RTIs, SSTIs, and post-surgical infections. Approximately 76% of clinicians identified *S. pneumoniae* as the predominant respiratory pathogen. Multiple clinicians also recognized *S. pneumoniae* as the most common causative organism in respiratory infections. These findings are consistent with previous literature. Shoar and Musher reported that *S. pneumoniae* remains the leading cause of community-acquired pneumonia, although its incidence has declined in some regions, particularly in the United States, followed by *Haemophilus influenzae*, *Staphylococcus aureus*, and Gram-negative bacilli [6]. Similarly, Ghia *et al*., also identified *S. pneumoniae* as the predominant etiological agent of community-acquired pneumonia in Indian adults [7].

Nearly half of the clinicians reported occasional encounters with MDR organisms in clinical practice, underscoring the expanding challenge of antimicrobial resistance in India. The frequent occurrence of recurrent infections and treatment failures with commonly used oral antibiotics, as reported by respondents, further reflects the limitations of conventional oral antimicrobial therapy in resistant infections. These findings are supported by Nagvekar *et al*., who observed that 26–33% of isolates were MDR, with these organisms frequently detected even at the time of hospital admission, indicating ongoing community and healthcare-associated exposure [8]. Similarly, Vaithiyam *et al*., reported a high burden of MDR organisms among clinically significant isolates, suggesting routine clinical encounters with resistant pathogens [9]. In addition, Jayaprada *et al*., demonstrated a substantial prevalence of MDR Gram-negative bacteria in clinical samples, further reinforcing the frequent exposure of clinicians to MDR organisms in everyday practice [10].

Broad-spectrum antimicrobial coverage was considered the most important factor influencing antibiotic selection by a large proportion of clinicians. This preference likely reflects the need for empirical therapy in settings where delayed microbiological confirmation, prior antibiotic exposure, and resistant pathogens are common. This is supported by Sivagnanam *et al*., who observed that clinicians frequently preferred broad-spectrum antibiotics due to perceived greater effectiveness, diagnostic uncertainty, concern about treatment failure, and patient expectations [11]. Wood *et al*., also noted that clinicians often chose broad-spectrum antibiotics based on perceived severity of illness, uncertainty in diagnosis, need for immediate effective coverage, and patient expectations [12].

Many participants reported performing culture and sensitivity testing prior to initiating antibiotic therapy. This is supported by Antony *et al*., who found that 92% of clinicians believed that culture samples should be obtained before starting antibiotics, while 69% supported routine culture and sensitivity testing prior to treatment initiation [13]. Similarly, Chatterjee *et al*., reported that clinicians frequently rely on culture and sensitivity testing along with treatment guidelines for antibiotic selection, reflecting increasing awareness of antimicrobial stewardship principles [14].

More than half of the participants reported prescribing faropenem for 5–7 days in adult infections. This preference aligns with current antimicrobial stewardship principles that favor shorter treatment durations when clinically appropriate. These findings are supported by Hamasuna *et al*., who evaluated faropenem in adults with acute uncomplicated cystitis and reported that a 7-day regimen was commonly used as a standard treatment duration, demonstrating nearly 80% clinical efficacy along with superior microbiological eradication compared with shorter courses [15]. Similarly, Gandra *et al*., reported that most clinical studies involving faropenem in urinary tract, respiratory, and SSTIs utilized treatment durations of 5–10 days, with 5–7 days being most common for UTIs and 7–10 days for respiratory and skin infections [16].

Another important finding observed in the present survey was the increased preference for faropenem in 11–25% of patients with UTIs. Many clinicians perceived faropenem to be highly effective in recurrent infections and considered its therapeutic effectiveness comparable to that of carbapenems such as meropenem or biapenem in selected adult patients. This finding is supported by Hamasuna *et al*., who demonstrated favorable clinical and microbiological outcomes with faropenem in adults with uncomplicated UTIs, supporting its therapeutic use in urinary tract infections [15]. Similarly, Gandra *et al*., highlighted the increasing clinical utilization of faropenem, particularly in UTIs associated with MDR and ESBL-producing organisms. Similarly, many of the participants reported prescribing faropenem in 11–25% of patients with SSTIs [16].

Many clinicians reported regularly monitoring patients for potential side effects or complications associated with faropenem therapy. This is supported by Pal *et al*., who reported routine monitoring of

gastrointestinal adverse effects, allergic reactions, and laboratory abnormalities during faropenem treatment, with most adverse events being mild and well tolerated [17]. Similarly, Hamasuna *et al*., included continuous safety assessments for adverse drug reactions and treatment-related complications throughout therapy, demonstrating the favorable tolerability profile of faropenem [15]. In addition, Gandra *et al.,* emphasized the importance of monitoring treatment response, adverse effects, and emerging antimicrobial resistance during faropenem use as part of antimicrobial stewardship practices [16].

The present survey provides important insights into clinicians' perspectives regarding the use of faropenem in the management of recurrent and MDR bacterial infections across India. The nationwide participation and assessment of usage patterns, perceived effectiveness, safety, and tolerability offer valuable information on the current clinical utilization of faropenem in routine practice and highlight the growing need for effective oral antimicrobial options in outpatient settings. However, the study has certain limitations. Its survey-based design relied on self-reported clinician responses, which may be subject to recall and reporting bias. In addition, the relatively small sample size may limit the generalizability of the findings to all clinicians across India. The study also did not evaluate patient-level clinical outcomes, microbiological confirmation, antimicrobial susceptibility patterns, long-term follow-up, or comparative effectiveness with other antibiotics. Therefore, the findings primarily reflect clinicians' perceptions and experiences rather than objectively measured clinical outcomes.

CONCLUSION

The present survey highlights the clinical relevance and widespread utilization of faropenem in the management of adult bacterial infections. RTIs are the most commonly encountered infections, with *S. pneumoniae* identified as the predominant pathogen. Broad-spectrum coverage and culture-based decision-making remain important considerations during antibiotic selection. Faropenem is commonly prescribed for urinary tract infections, SSTIs, and post-surgical infections, particularly as step-down therapy following intravenous antibiotics. Most clinicians report excellent tolerability, minimal adverse drug reactions, and favorable clinical outcomes with faropenem.

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Conflicts of Interest Disclosures: None

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