

Original Research Article

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A Prospective Cross-Sectional Study to Evaluate Prevalence and Antibiotic Sensitivity Pattern of the Bacterial Isolates from Pus Samples in a Tertiary Care Hospital of Telangana

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ABSTRACT

Keywords

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Multidrug-resistant (MDR) bacteria pose a significant global health threat, particularly in hospital settings where they are frequently associated with pus infections. The pathogens commonly implicated include *E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. This prospective cross-sectional study was conducted to determine the antibiotic susceptibility of pyogenic bacteria isolated from pus samples to various generations of antibiotics and to assess the incidence of the isolated bacteria. Fifty pus samples were collected over six months at the Surabhi Institute of Medical Sciences, Siddipet. The isolates were identified, and antimicrobial susceptibility testing was performed using the Kirby-Bauer disk diffusion method. The study concluded that pyogenic wound infections were prevalent, with *K. pneumoniae* showing the highest incidence, followed by *E. coli*, *P. aeruginosa*, and *S. aureus*. High resistance was observed in *K. pneumoniae* and *E. coli* to beta-lactams, fluoroquinolones, and cotrimoxazole, while *S. aureus* remained mostly sensitive to linezolid. These findings underscore the critical need for routine surveillance and adherence to guidelines to guide rational antibiotic therapy and curb resistance.

Introduction

Multidrug-resistant bacteria are recognised as a major challenge to global health. A rising number of hospital-associated pus infections are linked to MDR bacterial strains, including *E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. Accurate identification of the specific pathogens and their resistance patterns is essential for guiding targeted

treatment and effectively controlling the spread of resistant strains.

The objectives of this study were to determine the antibiotic susceptibility patterns of pyogenic bacteria isolated from pus samples across different generations of antibiotics, and to assess the incidence and distribution of the various bacterial species recovered from pyogenic infections.

Hypothesis

The study hypothesised that hospital-associated pus infections caused by *E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus* would exhibit a high prevalence of multi-drug resistance.

Materials and Methods

Study Design and Setting

A prospective cross-sectional study was carried out over a period of six months at the Surabhi Institute of Medical Sciences, located in Siddipet.

Sample Collection and Processing

A total of 50 pus samples were collected and analyzed.

Inclusion Criteria

Pus, wound swab, or aspirate samples from suspected infections that were collected and transported properly were included.

Exclusion Criteria

Samples that were contaminated, improperly collected, or repeat samples were excluded from the study. The collected samples were cultured on blood agar and Mac Conkey agar. Bacterial identification was performed

based on Gram staining, colony morphology, and a series of biochemical tests.

Antimicrobial Susceptibility Testing

Antimicrobial susceptibility testing was performed using the standard Kirby-Bauer disk diffusion method on Mueller-Hinton (M-H) agar plates.

The antibiotics tested included Penicillins, Fluoroquinolones, Cephalosporins, Amino glycosides, Carbapenems, and others. The susceptibility pattern interpretations were based on Clinical and Laboratory Standards Institute (CLSI) guidelines.

Results and Discussion

The study evaluated the percentage of organisms isolated, which were:

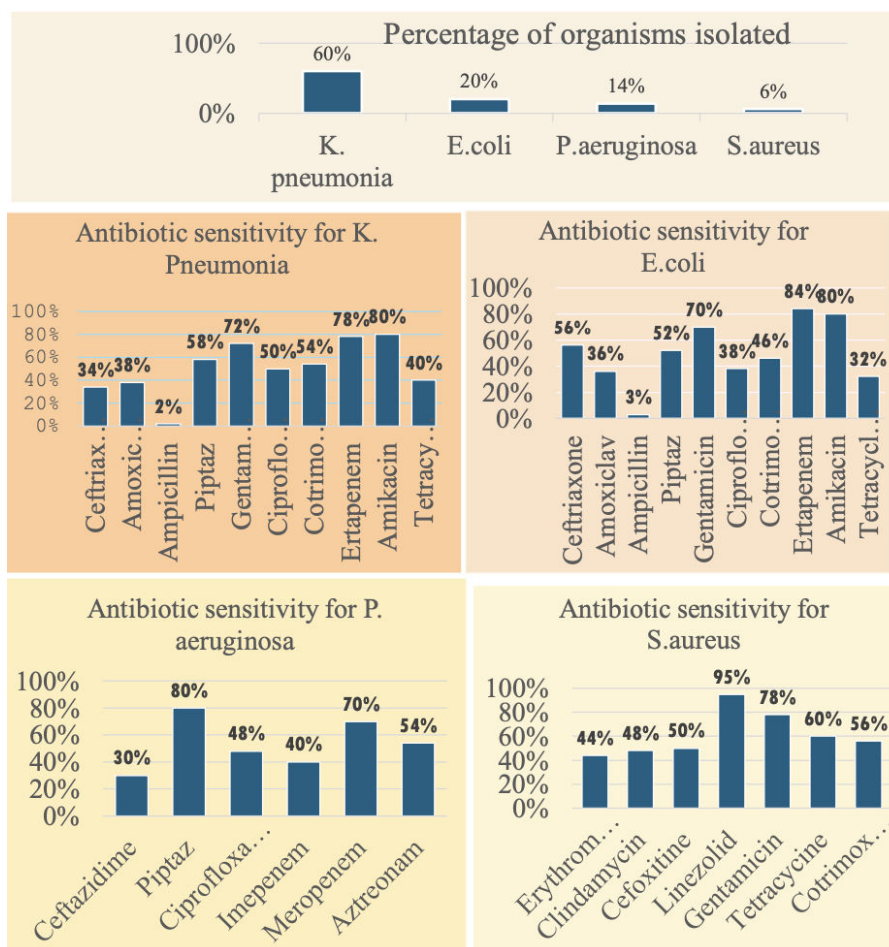
K. pneumoniae
E. coli
P. aeruginosa
S. aureus

In conclusion, pyogenic wound infections were found to be prevalent. Among the isolated bacteria, *K. pneumoniae* isolates demonstrated the highest incidence, followed sequentially by *E. coli*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*.

Table.1 Antibiotic Sensitivity Patterns (Selected Data from Charts)

Organism	Antibiotic	Sensitivity (%)
<i>K.pneumoniae</i>	Ciprofloxacin	50%
	Imipenem	70%
<i>E.coli</i>	Ciprofloxacin	54%
	Imipenem	80%
<i>P.aeruginosa</i>	Ceftazidime	95%
	Imipenem	80%
<i>S.aureus</i>	Linezolid	100%
	Clindamycin	60%

Chart.1 Percentage of organisms isolated and Antibiotic Sensitivity test



Regarding antibiotic resistance

K. pneumoniae and *E. coli* showed high resistance to beta-lactams, fluoroquinolones, and cotrimoxazole. Carbapenems and aminoglycosides retained partial activity, though resistance to these is noted to be rising. *P. aeruginosa* exhibited variable susceptibility patterns. *S. aureus* remains mostly sensitive to linezolid.

These findings emphasise the urgent need for routine surveillance of antimicrobial resistance patterns and strict adherence to CLSI guidelines. Such measures are crucial for guiding rational antibiotic therapy and effectively curbing the threat of emerging resistance. Betalactamases were not tested.

Author Contributions

N. Sindhuja: Investigation, formal analysis, writing—

original draft. Abhishek Velamuri: Validation, methodology, writing—reviewing.

Data Availability

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethical Approval Not applicable.

Consent to Participate Not applicable.

Consent to Publish Not applicable.

Conflict of Interest The authors declare no competing interests.

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