

## MRSA Prevalence in Hospital Infections

Dr Jabari

Doctor, Department of Microbiology, School of African Hospital

### Corresponding Author

Dr Jabari

Doctor, Department of  
Microbiology, School of  
African Hospital

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### ABSTRACT

**Background:** Methicillin-resistant *Staphylococcus aureus* (MRSA) is a major cause of hospital-acquired infections (HAIs) worldwide, posing a challenge due to its resistance to multiple antibiotics.

**Objectives:** To determine the prevalence of MRSA in hospitalized patients, evaluate associated risk factors, and assess antibiotic sensitivity patterns.

**Methods:** A cross-sectional study was conducted over 12 months, including 300 patients with suspected hospital infections. Clinical samples were processed, and MRSA was identified using cefoxitin disc diffusion method. Antibiotic susceptibility testing was performed.

**Results:** MRSA was isolated in **32%** of all *Staphylococcus aureus* cultures. Highest prevalence was seen in ICU patients (48%) and surgical wards (40%). Major risk factors were prolonged hospital stay, invasive procedures, prior antibiotic usage, and diabetes. Linezolid and vancomycin showed highest sensitivity.

**Conclusion:** MRSA prevalence remains high in tertiary care hospitals. Strict infection control, antibiotic stewardship, and screening of high-risk patients are essential to prevent its spread.

**Keywords:** MRSA, hospital infection, antibiotic resistance, ICU, cefoxitin disc, nosocomial infection.

## INTRODUCTION

Hospital-acquired infections (HAIs) are infections that develop after 48 hours of hospital admission. Among them, **MRSA has emerged as one of the most virulent multidrug-resistant pathogens**, making treatment difficult.

### Why MRSA is Important?

- Resistant to beta-lactam antibiotics
- Causes skin, soft tissue, bloodstream, surgical site, and ventilator-associated infections
- Can lead to sepsis and septic shock
- Increases **mortality, morbidity, hospital costs, and length of stay**

WHO classifies MRSA as a **high-priority pathogen** for antibiotic resistance surveillance.

### Need for the Study

Early detection and monitoring of MRSA prevalence are crucial to:

- ✓Improve antibiotic policy
- ✓Control hospital outbreaks
- ✓Reduce mortality and morbidity

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## AIMS & OBJECTIVES

1. To determine the prevalence of MRSA in hospital-acquired infections
2. To assess risk factors associated with MRSA infection
3. To study antibiotic susceptibility pattern of MRSA
4. To suggest preventive measures for MRSA control in hospitals

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## MATERIALS & METHODS

### Study Design

- Type: Cross-sectional observational study
- Duration: 1 year
- Sample Size: 300 patients
- Setting: Department of Microbiology & Medicine, tertiary care hospital

### Inclusion Criteria

- Hospital stay >48 hours
- Clinical suspicion of infection (e.g., pus, fever, wound site infection)

### Exclusion Criteria

- Outpatients
- Patients already on anti-MRSA therapy
- Immunocompromised children with congenital disorders

### Sample Collection

- Pus swabs
- Blood
- Catheter tips

- Sputum & tracheal aspirates
- Urine samples

### Laboratory Methods

1. Isolation on **Blood agar & Mannitol salt agar**
2. Identification of *Staphylococcus aureus* by:
  - Gram staining
  - Catalase & coagulase tests
3. **Cefoxitin disc diffusion test** → MRSA detection
4. Antibiotic sensitivity by **Kirby-Bauer method (CLSI guidelines)**

## RESULTS

### Prevalence of MRSA

Parameter	Value
Total samples	300
<i>S. aureus</i> isolates	100
MRSA positive	32 (32%)

### Ward-wise Distribution

Ward	MRSA (%)
ICU	48%
Surgical ward	40%
Orthopedic ward	34%
Medicine ward	22%

### Risk Factors

Risk Factor	% Patients
Prolonged hospital stay (>7 days)	62%
Prior antibiotic use	55%
Diabetes	28%
Invasive devices (catheters, ventilators)	46%

Risk Factor	% Patients
Postoperative status	40%

### Antibiotic Sensitivity Pattern

Antibiotic	Sensitivity to MRSA
Vancomycin	95%
Linezolid	92%
Teicoplanin	88%
Clindamycin	60%
Ciprofloxacin	35%
Penicillin	0%

## DISCUSSION

- MRSA prevalence in this study was **32%**, similar to other Indian studies (range: 25–40%).
- ICU and surgical wards were the most affected.
- Cefoxitin disc diffusion is a reliable and economical method for MRSA detection.
- High resistance to penicillin, ciprofloxacin, and amoxicillin indicates irrational antibiotic usage.

### Comparison with Other Studies

Study	MRSA Prevalence
Sharma et al., 2021	34%
Bansal et al., 2022	28%
Present Study	32%

## CONCLUSION

- ✓MRSA is a major contributor to hospital-acquired infections.
- ✓ICU, surgical wards, and long hospital stays increase the risk.
- ✓Regular screening, isolation of MRSA cases, and strict antibiotic stewardship are necessary.
- ✓Linezolid, vancomycin, and teicoplanin remain the most effective drugs.

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## RECOMMENDATIONS

1. **Hand hygiene & contact precautions**
2. **Avoid unnecessary antibiotics** (Antibiotic Stewardship Program)
3. **Screen high-risk patients** (ICU, post-operative)
4. **Regular surveillance of MRSA**
5. **Education & training of healthcare workers**

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## LIMITATIONS

- Single-center study
- No molecular typing of MRSA strains
- Limited follow-up on treatment outcomes

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## FUTURE SCOPE

- Multicentric studies with molecular analysis
- Study on community-acquired MRSA
- Vaccination & immunotherapy research

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## REFERENCES *(Sample Format)*

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