

DETECTION OF  
*STAPHYLOCOCCUS AUREUS*  
TOXIN GENES AND  
METHICILLIN RESISTANCE  
IN CLINICAL SAMPLES

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# Introduction

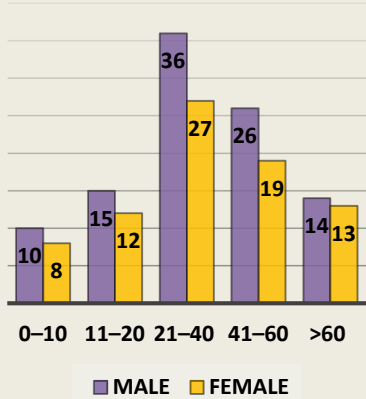
- *Staphylococcus aureus* can cause infections ranging from minor skin lesions to life-threatening sepsis.
- Its virulence is attributed to toxin genes like Staphylococcal enterotoxins (Sea, Seb), exfoliative toxins (eta, etb) and Toxic Shock Syndrome Toxin (tst).
- Methicillin-resistant *Staphylococcus aureus* (MRSA) are considered a serious global health threat, leading to increased mortality and antimicrobial resistance.
- The study aims to identify toxin genes and methicillin resistance in *S. aureus* isolates, examining correlations between virulence factors and antimicrobial resistance patterns for better clinical outcomes.

# Material & Methods

- Type of study : Cross-Sectional
- Duration of study : 18 months (January 2024 - June 2025)
- Place of study : Department of Microbiology in a tertiary care hospital of southern Odisha.
- All confirmed isolates of *Staphylococcus aureus* from clinical samples, including blood, wound swabs, pus and urine specimens, were collected.
- Antimicrobial susceptibility testing was done by Kirby-Bauer Disc Diffusion method as per CLSI guidelines.
- DNA extraction was performed, followed by multiplex PCR amplification targeting the toxin genes and *mecA* genes.

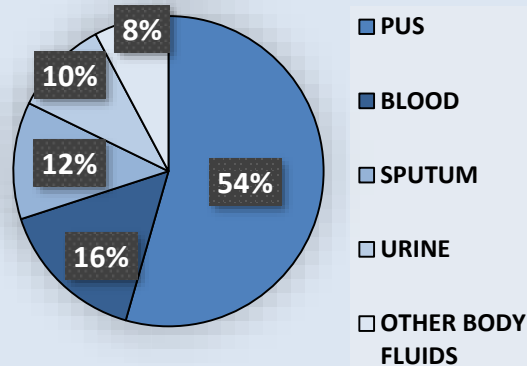
# Results

Association Of Age With Sex Among S. aureus Isolates (n = 180)

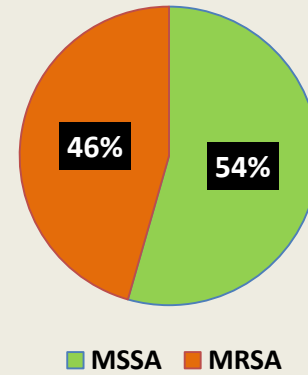


INFECTION SOURCES

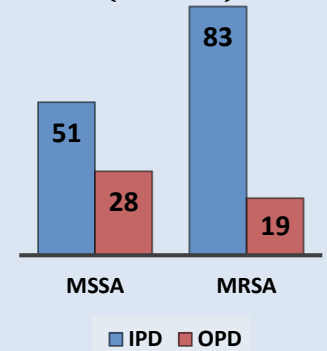
n = 180



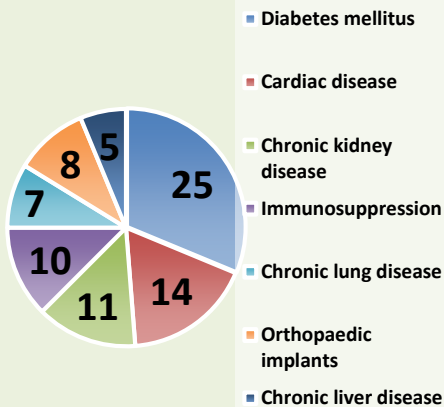
METHICILLIN SUSCEPTIBILITY (n = 180)



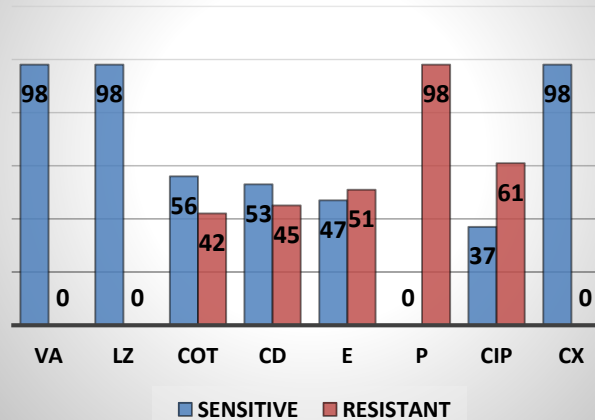
DISTRIBUTION OF MSSA AND MRSA AMONG IPD AND OPD (n = 180)



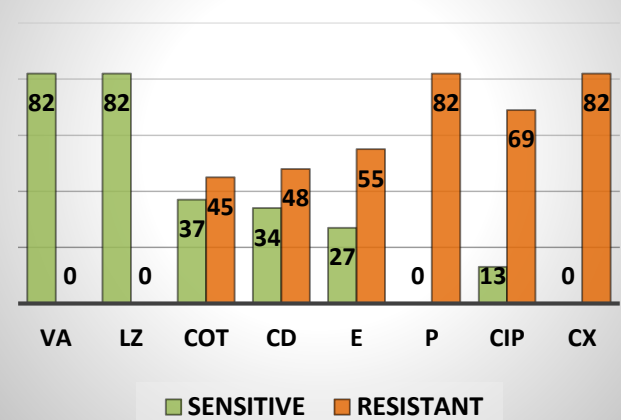
MRSA among co-morbid patients (n = 82)



AST PATTERN OF MSSA (n = 98)

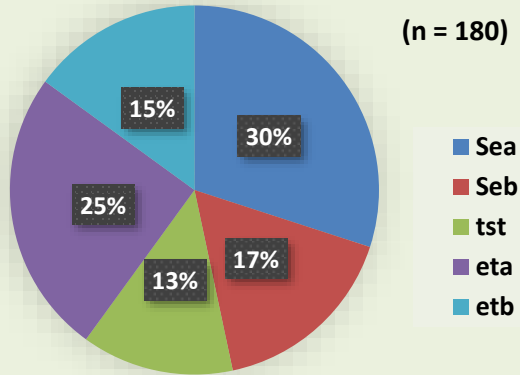


AST PATTERN OF MRSA (n = 82)



# Results

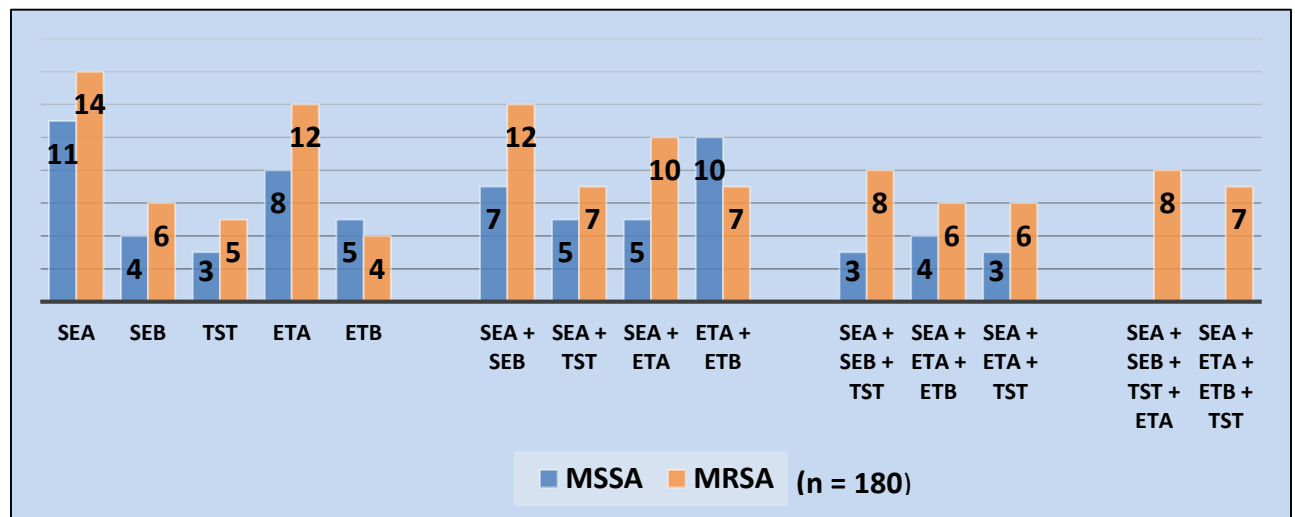
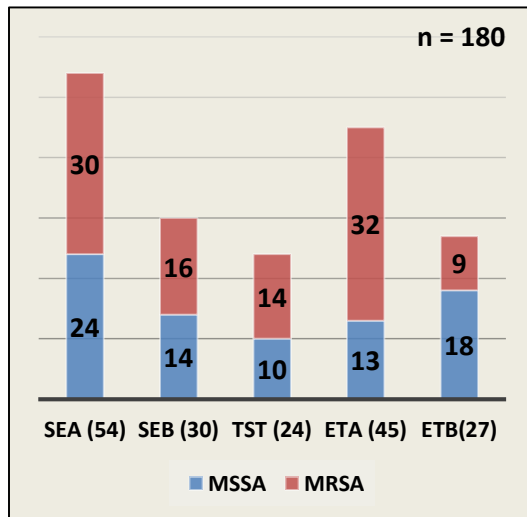
PREVALANCE OF TOXIN GENES



TOXIN GENES AMONG VARIOUS SAMPLES

SEA (30%)	Most frequently detected across all sample types.
SEB (17%)	Less common but significant in invasive disease.
TSST-1 (13%)	Strong association with bloodstream infections
ETA (25%) & ETB (15%)	Primarily linked to pus samples and pediatric infections.

DISTRIBUTION OF TOXIN GENES AMONG MSSA AND MRSA ISOLATES



# Conclusion

- Methicillin resistant *Staphylococcus aureus* (MRSA) isolates demonstrated higher frequencies of multiple toxin genes (53.3%) compared to methicillin-sensitive strains.
- 28% of MRSA isolates were resistant to Ciprofloxacin, Cotrimoxazole, Erythromycin and Clindamycin.
- The high prevalence of toxin genes and methicillin resistance in *S. aureus* isolates emphasizes their clinical significance in pathogenesis and disease severity.
- Integrating virulence and resistance profiling can guide timely, targeted therapy, improve patient outcomes, and strengthen infection control.