



FREQUENCY OF ISOLATION OF STAPHYLOCOCCUS AUREUS FROM CLINICAL SAMPLES AND ITS ANTIMICROBIAL SUSCEPTIBILITY PATTERN AMONG VARIOUS ISOLATES: A STUDY IN TERTIARY CARE HOSPITAL.

Clinical Microbiology

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ABSTRACT

Introduction: Staphylococcus aureus is ubiquitous in environment. Staphylococcus is commensal bacteria as well as human pathogen. It can colonize on the skin, nose and pharynx with anterior nares as the main reservoir. The emergence of methicillin-resistant Staphylococcus aureus (MRSA) with multi resistant has posed challenges in the treatments. **Material And Methods:** A retrospective study from Department of Microbiology, Dr. Rajendera Prasad Government Medical College, Kangra at Tanda for 6 months from January 2022 to June 2022. **Results:** A total of 6184 clinical samples, 485 were positive of Staphylococcus aureus. Rate of isolation of Staphylococcus aureus in regard to clinical specimen was highest in pus 210 (43.2%), followed by blood samples 134 (27.6%). Respiratory samples were 93 (19.17%) followed by urine samples 27 (5.56%). Other specimens included ear swabs, BAL, endocervical swabs, which were 21(4.32%). Antimicrobial susceptibility testing revealed resistance for penicillin 391 (89%), azithromycin 244 (50.3%), clindamycin 178 (36.5%), cotrimoxazole 183 (37.7%), cephoxitin 150 (30.9%). Antimicrobial susceptibility test showed no resistance for vancomycin and linezolid. **Conclusion:** Staphylococcus aureus isolates exhibited high resistance to penicillin and azithromycin. No resistance was observed with vancomycin and linezolid.

KEYWORDS

INTRODUCTION:

Staphylococcus aureus is ubiquitous in environment. *Staphylococcus* is commensal bacteria as well as human pathogen.¹ *Staphylococcus aureus* was first discovered by Surgeon, Alexander Ogston in 1880 from patients with ulcerated sores. *Staphylococcus* is a Gram positive $\approx 0.8\mu\text{m}$ in diameter, arranged in a "string of grapes", non-motile, non-spore former with some strains capsulated under microscope.² It can colonize on the skin, nose and pharynx with anterior nares as the main reservoir.

The bacterium is infectious only when it invades the skin, mucus membrane and internal organs causing range of illness from minor skin infections like impetigo, folliculitis and abscess, to life threatening conditions like pneumonia, meningitis, endocarditis, toxic shock syndrome.³

The emergence of methicillin-resistant *Staphylococcus aureus* (MRSA) with multi resistant has posed challenges in the treatments.

MATERIAL AND METHODS:

A retrospective study from Department of Microbiology, Dr. Rajender Prasad Government Medical college, Kangra at Tanda for 6 months from January 2022 to June 2022.

Clinical specimens from various sites were cultured on Blood agar, MacConkey agar and Chocolate agar. Isolates were identified to be *Staphylococcus aureus* by using catalase, coagulase tests using control strains. Antimicrobial susceptibility test of *Staphylococcus aureus* was done by Kirby Bauer disc diffusion method as per CLSI guidelines.

RESULTS:

A total of 6184 clinical samples, 485 were positive of *Staphylococcus aureus*. Rate of isolation of *Staphylococcus aureus* in regard to clinical specimen was highest in pus 210 (43.2%), followed by blood samples 134 (27.6%).

Respiratory samples were 93 (19.17%) followed by urine samples 27 (5.56%). Other specimens included ear swabs, BAL, endocervical swabs, which were 21(4.32%). (Table 1)

Of a total of 485 *Staphylococcus aureus* positive samples isolated. Males had higher isolation rate 262(54%) versus females 223(45.9%). (Figure 2)

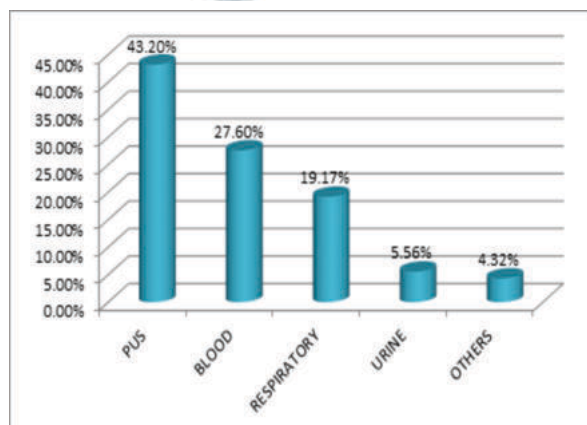
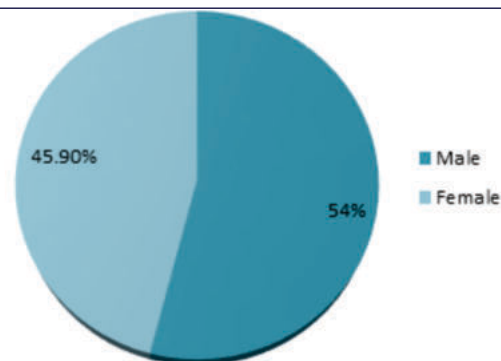


Figure 1: Isolation of Staphylococcus aureus in various clinical samples.

- Distribution of *Staphylococcus aureus* was the most in the age group 19-60 years 281(57.9%) while it was less beyond 61 years 93(19%).
- Out of 485 *Staphylococcus aureus* isolates 150(30.9%) were Methicillin Resistant *Staphylococcus aureus* and 335(69.1%) were Methicillin sensitive *Staphylococcus aureus*. (Figure 3)

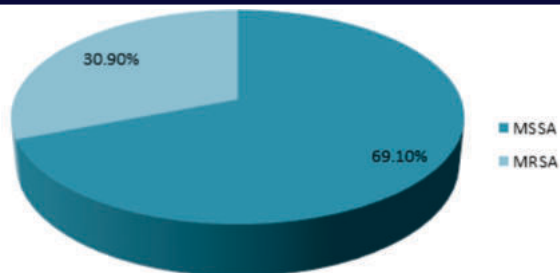


Figure 3: Isolation Of MSSA And MRSA

The frequency of MRSA in male patients was 77(51.3%) versus 73(48.6%) in female patients. In addition, the 19-60 age groups had highest rate of MRSA isolation with 82 (54.6%), followed by ≤ 18 years which had 39(26%). Relatively low frequency of MRSA 31(20%) was obtained in patients above 61 years of age.

Antimicrobial susceptibility testing revealed resistance for penicillin 391 (89%), azithromycin 244 (50.3%), clindamycin 178 (36.5%), cotrimoxazole 183 (37.7%), cephoxitin 150 (30.9%). Antimicrobial susceptibility test showed no resistance for vancomycin and linezolid. (Figure 4)

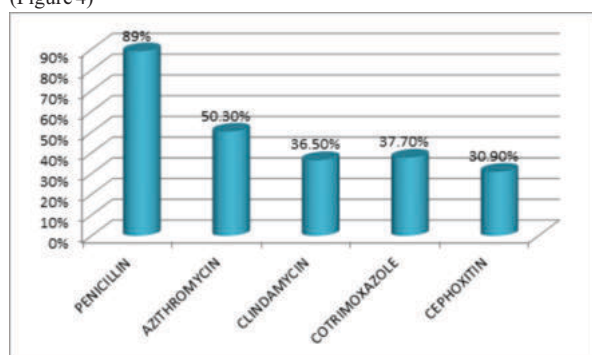


Figure 4: Antimicrobial susceptibility pattern of *Staphylococcus aureus*.

DISCUSSION:

MRSA has become global public health concern because of its high virulence capacity and high capability to cause a wide spectrum of life threatening infections and its capacity to adapt to different environmental conditions. Despite the introduction of antimicrobial therapy and the recent improvements of medical services, MRSA is recognized as a major cause of nosocomial infections which result in significant morbidity and mortality rates.⁴

Our study showed that *Staphylococcus aureus* were found higher in male 54% than female 45.9% and MRSA was found higher in male 51.3% than female 48.6%. The result was in concordance to LK Khanal et al.⁵

In our study, Methicillin Resistant *Staphylococcus aureus* was 30.9%. Similar results were seen with Bhatt CP et al. We documented a higher prevalence of resistance to antibiotics in MRSA isolates when compared to MSSA isolates. All MRSA isolates encountered in this study were completely resistant (100%) to penicillin. Similar results were noted for penicillin among MRSA strains in India.⁶ All isolates were sensitive to vancomycin and linezolid, this result was similar to Baral R et al.⁷

CONCLUSION:

- In our study, higher prevalence of *Staphylococcus aureus* was seen in age group 19-60 years.
- *Staphylococcus aureus* isolates exhibited high resistance to penicillin and azithromycin. No resistance was observed with vancomycin and linezolid.
- Robust antimicrobial stewardship can help in preventing the spread and reducing the emergence of resistance.

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