



TO STUDY THE PREVALENCE OF NASAL CARRIAGE OF STAPHYLOCOCCUS AUREUS IN PATIENTS UNDERGOING ABDOMINAL SURGERY

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ABSTRACT

Background: Nasal colonization by *Staphylococcus aureus*, particularly methicillin-resistant *Staphylococcus aureus* (MRSA), is an important concern in patients undergoing surgery because colonization may contribute to subsequent infection and healthcare transmission. **Objective:** To determine the prevalence of nasal carriage of *S. aureus* and MRSA and to assess the antimicrobial susceptibility pattern among patients undergoing elective abdominal surgery. **Methods:** A one-year cross-sectional study was conducted from January to December 2022. Nasal swabs were collected from 122 patients undergoing elective abdominal surgery. Samples were processed by Gram staining and culture on blood agar and mannitol salt agar. *S. aureus* was identified using colony morphology, catalase, coagulase and other biochemical reactions. Antimicrobial susceptibility was assessed by Kirby-Bauer disk diffusion, and methicillin resistance was screened using a 30- μ g cefoxitin disk. **Results:** *S. aureus* was isolated from 58 of 122 samples (47.5%), while 64 (52.4%) yielded coagulase-negative staphylococci. MRSA was identified in 17 patients, corresponding to 13.93% of the study population. Among *S. aureus* isolates, the highest resistance was reported to erythromycin (76.2%) and clindamycin (64.3%). Among MRSA isolates, resistance was highest to erythromycin (94.1%), levofloxacin (88.23%), and clindamycin (70.5%). **Conclusion:** The study demonstrates a substantial burden of nasal *S. aureus* carriage and MRSA colonization among elective abdominal surgery patients. Preoperative screening, appropriate decolonization strategies, hand hygiene and antimicrobial stewardship may help reduce the risk of transmission and postoperative infection.

KEYWORDS: *Staphylococcus Aureus*; MRSA; Nasal Carriage; Abdominal Surgery; Antimicrobial Susceptibility; Cefoxitin; Preoperative Screening

1. INTRODUCTION

Staphylococcus aureus is an important human pathogen capable of colonization and a broad spectrum of disease. Nasal carriage is a recognized reservoir and may be particularly relevant in surgical patients because colonization can precede postoperative infection. Methicillin-resistant *S. aureus* represents an additional infection-control challenge because of resistance to beta-lactam antimicrobial agents.

The source thesis emphasizes the importance of preoperative identification of *S. aureus* carriers and reports that nasal decolonization with mupirocin has been associated with reduced surgical-site infection in selected settings. The present study was undertaken to determine the prevalence of nasal *S. aureus* carriage and antimicrobial susceptibility among patients undergoing abdominal surgery, with specific assessment of MRSA.

2. OBJECTIVES

1. To determine the prevalence of nasal carriage of *Staphylococcus aureus* among patients undergoing elective abdominal surgery.
2. To determine the antimicrobial susceptibility pattern of *S. aureus* isolates.
3. To detect MRSA among the *S. aureus* isolates using cefoxitin disk diffusion.

3. METHODOLOGY

Study design and setting: A cross-sectional study was conducted in the Department of Microbiology, KAHER J.N. Medical College, Belagavi. Samples were obtained from patients undergoing abdominal surgery at Dr. Prabhakar Kore Charitable Hospital, Belagavi. The study period was 1 January 2022 to 31 December 2022.

Study population and sampling: The study included patients undergoing elective abdominal surgery, including laparotomy, appendectomy and hernia repair. Laparoscopic abdominal procedures and obstetrics-gynecology procedures were excluded. A total of 122 participants were included using systematic sampling.

Specimen collection and processing: Sterile cotton swabs were used to collect specimens from both anterior nares and vestibules approximately 12 hours before surgery. Samples were transported promptly to the laboratory. One swab was used for direct Gram staining and the other for culture.

Isolation and identification: Specimens were inoculated on blood agar and mannitol salt agar and incubated at 37°C for 18–24 hours. Suspected isolates were evaluated by Gram staining, colony morphology, catalase testing, coagulase testing, urease and mannitol/motility reactions. Isolates consistent with *S. aureus*



were confirmed by the combination of morphology and biochemical characteristics.

Antimicrobial susceptibility testing: Susceptibility was assessed using the Kirby–Bauer disk diffusion method on Mueller–Hinton agar with a 0.5 McFarland inoculum. Antibiotics assessed in the source study included penicillin, cefoxitin, ampicillin, azithromycin, erythromycin, clindamycin, cotrimoxazole, doxycycline, gentamicin and levofloxacin, among others. Interpretation was reported according to CLSI criteria in the thesis. *S. aureus* ATCC 25923 was used as the quality-control strain.

MRSA detection: Methicillin resistance was screened using a 30- μ g cefoxitin disk. In the source study, a cefoxitin inhibition zone of ≥ 25 mm was interpreted as susceptible and ≤ 24 mm as resistant.

4. RESULTS

A total of 122 patients were studied. Ninety (73.77%) were male and 32 (26.23%) were female. The most frequent procedures were umbilical hernia repair (41; 33.60%), inguinal hernia repair (35; 28.68%) and appendectomy (12; 9.83%). The largest age group was patients older than 60 years (40; 32.78%).

Finding	Number	Percentage	Interpretation
Total participants	122	100	Elective abdominal surgery
<i>S. aureus</i> isolates	58	47.5	Nasal carriage
Coagulase-negative staphylococci	64	52.4	Other staphylococcal isolates
MRSA isolates	17	13.93	Among all participants

Antimicrobial susceptibility of *S. aureus* showed the highest reported sensitivity to cefoxitin (98%), novobiocin (97.6%) and penicillin (95.2%), while resistance was highest to erythromycin (76.2%) and clindamycin (64.3%). The source thesis reports that 41 isolates were included in the displayed antimicrobial susceptibility dataset; this denominator should be verified against the original laboratory dataset before submission.

Among 17 MRSA isolates, the highest susceptibility was reported to novobiocin (94.1%) and cotrimoxazole (76.5%), followed by clindamycin (70.6%), while resistance was highest to cefoxitin (100%), erythromycin (94.1%), levofloxacin (88.23%) and clindamycin (70.5%).

5. DISCUSSION

The present study identified *S. aureus* nasal carriage in 47.5% of patients undergoing elective abdominal surgery, with MRSA carriage identified in 13.93% of the total study population. The observed *S. aureus* carriage rate is higher than the rates cited in the thesis for several Asian populations. Differences may reflect variation in patient characteristics, healthcare exposure, geographical setting, specimen collection and laboratory methods.

The MRSA prevalence observed in this study was higher than several rates discussed in the source thesis, including reports from Singapore, the United States and Indonesia. Such differences reinforce the importance of institution-specific surveillance because MRSA carriage varies between hospitals and patient populations.

Male participants constituted the majority of the study population and also accounted for most *S. aureus*-positive isolates. However, the present dataset is observational and does not establish sex as an independent risk factor for carriage. Larger studies incorporating multivariable analysis and relevant clinical risk factors would be required to determine independent predictors.

The antimicrobial susceptibility findings demonstrate substantial resistance to erythromycin and clindamycin among *S. aureus* isolates, with an even higher resistance burden among MRSA isolates. These findings highlight the importance of culture-directed therapy and local antimicrobial-resistance surveillance rather than empirical assumptions based solely on historical susceptibility patterns.

6. CLINICAL AND INFECTION-CONTROL IMPLICATIONS

The findings support consideration of preoperative nasal screening for *S. aureus* and MRSA in settings where local epidemiology indicates a meaningful carriage burden. Identification of carriers can facilitate targeted infection-control measures and, where clinically appropriate and supported by institutional protocols, decolonization strategies. Rigorous hand hygiene and antimicrobial stewardship remain essential components of preventing transmission and limiting resistance.

7. LIMITATIONS

The study was conducted at a single institutional setting with a relatively small sample of 122 participants, limiting generalizability. The cross-sectional design permits estimation of carriage prevalence but does not establish subsequent surgical-site infection or causality. The source document does not provide postoperative infection outcomes or molecular confirmation of *mecA*-mediated resistance. In addition, the antimicrobial susceptibility section contains a reported denominator of 41 isolates for the broader *S. aureus* antibiogram while 58 *S. aureus* isolates were reported overall; this discrepancy should be reconciled from the original laboratory records before journal submission.

8. SUGGESTIONS

1. Consider systematic preoperative surveillance for *S. aureus*/MRSA according to local epidemiology and institutional policy.
2. Strengthen hand hygiene and contact precautions for identified carriers where indicated.
3. Establish locally appropriate decolonization protocols based on current evidence and antimicrobial-resistance patterns.
4. Continue periodic antimicrobial susceptibility surveillance to guide empirical and targeted therapy.



5. Conduct larger multicentre prospective studies incorporating postoperative surgical-site infection outcomes and risk-factor analysis.

9. CONCLUSION

A substantial prevalence of nasal *S. aureus* carriage (47.5%) and MRSA carriage (13.93%) was observed among patients undergoing elective abdominal surgery. High resistance to erythromycin and clindamycin was observed among *S. aureus* isolates, while MRSA isolates demonstrated marked resistance to several tested agents. Preoperative surveillance, appropriate infection-control measures, judicious antimicrobial use and evidence-based decolonization strategies may contribute to reducing transmission and postoperative infection risk.

10. AREA FOR FURTHER RESEARCH

Future multicentre prospective studies should evaluate the relationship between preoperative nasal carriage and postoperative surgical-site infection, identify independent clinical risk factors for MRSA carriage, and assess the effectiveness and cost-effectiveness of targeted versus universal screening and decolonization strategies.

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