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Research Article

**PREVALENCE OF MULTI-DRUG RESISTANT
STAPHYLOCOCCUS AUREUS AMONG HEALTHCARE
STAFF MEMBERS IN SURGICAL INTENSIVE CARE UNIT
OF A LARGE TERTIARY CARE HOSPITAL IN LAHORE**Dr Iqra Nawaz¹, Dr Ayesha Riaz¹, Dr Qurat Ul Ain Akram²¹Lahore General Hospital²POF Hospital Wah Cantt, Rawalpindi**Article Received:** January 2020 **Accepted:** February 2020 **Published:** March 2020**Abstract:**

Introduction: Staphylococcus aureus has long been recognized as an important pathogen in human disease. Staphylococcal infections occur frequently in hospitalized patients and they have severe consequences, despite giving antibiotic therapy. **Aims and objectives:** The basic aim of the study is to analyse the prevalence of multi-drug resistant Staphylococcus aureus among healthcare staff members in Surgical Intensive care unit of a large tertiary care hospital in Lahore. **Material and methods:** This descriptive study was conducted in Lahore general hospital, Lahore during March 2019 to December 2019. A total of 200 nasal swabs were collected from the health care workers who were working in various clinical departments of the hospital. A written informed consent was taken from all the study subjects. Nasal swabs were collected from the anterior nares of both the nostrils with a sterile swab stick which was moistened with saline. **Conclusion:** It is concluded that most important factor for preventing nosocomial infections is compliance of the health professionals with the sanitary and the antibacterial guidelines.

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INTRODUCTION:

Staphylococcus aureus has long been recognized as an important pathogen in human disease. Staphylococcal infections occur frequently in hospitalized patients and they have severe consequences, despite giving antibiotic therapy. Due to an increasing number of infections which are caused by the methicillin-resistant *S. aureus* (MRSA) strains which are now most often multi-drug-resistant, the therapy has become problematic [1].

The ecological niches of the *S. aureus* strains are the anterior nares of humans. Three patterns of carriage are known. Approximately 20% of the individuals almost always carry one type of strain and they are called persistent carriers [2]. A large proportion of the population (60%) harbours *S. aureus* intermittently, and the strains change with varying frequencies. Such persons are called intermittent carriers. Finally, a minority of the people (20%) almost never carry *S. aureus* and they are called noncarriers [3]. A persistent carriage is more common in children than in adults, and many people change their pattern of carriage between the age of 10 and 20 years. The reasons for these differences in the colonization patterns are unknown. A persistent carriage seems to have a protective effect on the acquisition of other strains, at least during the hospitalization of the patients [4]. This barrier to the colonization is reduced when the carriers are treated with antibiotics.

Methicillin-resistant *Staphylococcus aureus* (MRSA) strains or multidrug-resistant *S. aureus*, initially described in 1960s, emerged in the last decade as a cause of nosocomial infections responsible for rapidly progressive, potential fatal diseases including life-threatening pneumonia, necrotizing fasciitis, endocarditis, osteomyelitis, severe sepsis, and toxinoses such as toxic shock syndrome [5]. A multifactorial range of independent risk factors for MRSA has been reported in literature and include immunosuppression, hemodialysis, peripheral malperfusion, advanced age, extended in-hospital stays, residency in long-term care facilities (LTCFs), inadequacy of antimicrobial therapy, indwelling devices, insulin-requiring diabetes, and decubitus ulcers, among others [6].

Aims and objectives

The basic aim of the study is to analyse the prevalence of multi-drug resistant *Staphylococcus aureus* among healthcare staff members in Surgical Intensive care unit of a large tertiary care hospital in Lahore.

MATERIAL AND METHODS:

This descriptive study was conducted in Lahore general hospital, Lahore during March 2019 to December 2019. A total of 200 nasal swabs were collected from the health care workers who were working in various clinical departments of the hospital. A written informed consent was taken from all the study subjects. Nasal swabs were collected from the anterior nares of both the nostrils with a sterile swab stick which was moistened with saline. The primary inoculations of the collected swabs were done on 10% sheep blood agar medium, MacConkey's agar medium and Mannitol salt agar medium. The plates were incubated aerobically at 37°C for 24 hours and they were examined for growth. The *Staphylococcus aureus* which was isolated from the nasal swab samples was identified by standard methods based on the colony morphology, pigment production, gram staining, the catalase test, the slide and tube coagulase test.

Statistical analysis

All the collected data was entered into SPSS version 20. P value of ≤ 0.05 was used as level of significance. Data was stratified for age, gender, type of stroke and smoking to deal with effect modifiers. Post-stratification chi-square test was applied taking p-value ≤ 0.05 as significant.

RESULTS:

A total of 315 nasal swab samples from various clinical departments were randomly collected and screened during the course of the study. From these, a total of 70 yielded *Staphylococcus aureus* in the culture. The prevalence of the *S. aureus* nasal carriage was higher among the male HCWs (54.28%) than among the female HCWs (45.71%). The carriage rate was the highest in the orthopaedics department, followed by those in the surgery and gynecology departments. The difference in the nasal carriage of *S. aureus* between doctors and nurses was not statistically significant, while the difference was quite significant between the 3rd and 4th grade workers as compared to that between the doctors or nurses.

Table 01: Association of *S. aureus* among participants with regard to age, gender, and case.

Variable		Presence of <i>S. aureus</i>		COR (95% CI)	p Value	AOR (95% CI)	p Value
		No (N(%))	Yes (N(%))				
Sex	Female	19 (35.2)	35 (64.8)	1.12 (0.51, 2.45)	0.78	-	-
	Male	29 (38.2)	47 (61.8)	1		-	-
Age group	<12	3 (15)	17 (85.0)	5.67 (1.23, 26.13)	0.26	6.23 (1.4, 27.8)	0.017
	13–18	3 (21.4)	11 (78.6)	3.6 (0.72, 17.42)	0.12	4.03 (0.87, 18.8)	0.075
	19–40	17 (34)	33 (66)	1.72 (0.56, 5.27)	0.343	2.13 (0.76, 6.02)	0.152
	41–60	14 (56)	11 (44)	0.88 (0.27, 2.81)	0.637	0.75 (0.22, 2.5)	0.806
	≥61	11 (52.4)	10 (47.6)	1	0.12	1	0.028
Case	Abscess	10 (21)	24 (29)	1.6(0.56, 4.53)	0.38		
	Burn	9 (19)	20 (24)	1.09 (0.37, 3.19)	1.09		
	Diabetic	15 (31)	14 (17)	0.66 (0.22, 1.96)	0.451		
	Surgical wound	14 (29)	24 (29)	1			

DISCUSSION:

S. aureus is an important causative agent of hospital-associated infections worldwide. Studying the pathogen at its molecular level has the potential to bring about breakthroughs in diagnosis, treatment, and infection control. In the current study we determined the molecular epidemiology of *S. aureus* isolates using the next generation whole genome sequencing facility available at KCMC-KCRI Biotechnology Laboratory in Moshi, Tanzania [7].

Multilocus sequence typing revealed 13 different sequence types among the 30 *S. aureus* isolates. This diversity suggests that *S. aureus* infections in the hospitalized patients that were sampled were not epidemiologically related. This is in line with similar findings in other studies in Africa [40] and other parts of the world [8]. The high genetic diversity of *S. aureus* lineages confers their high adaptability to different environments resulting in widespread distribution [9]. Sequence type 8 MRSA which has been observed to be the predominant strain in our hospital is also considered to be the most studied CA-MRSA. The strain has been observed in other parts of the world as a cause of infections in both hospital and community settings [10].

CONCLUSION

It is concluded that most important factor for preventing nosocomial infections is compliance of the health professionals with the sanitary and the antibacterial guidelines. To achieve this, the health professionals should be informed about the potential

consequences of the nosocomial infections, both inside and outside the hospital, and their cooperation should be sought to diminish the carriage of *Staphylococcus aureus*.

REFERENCES:

- McAnally TP, Lewis MR, Brown DR. Effect of rifampin and bacitracin on nasal carriers of *Staphylococcus aureus*. *Antimicrob Agents Chemother.* 1984 April;25(4):22–26.
- Paul MO, Lamikanra A, Aderibigbe DA. Nasal carriers of coagulase positive staphylococci in a Nigerian hospital community. *Trans. R. Soc. Trop. Med. Hyg.* 1982;76(3):319–23.
- Carter A, Heffernan H, Holland D, Ikram R, Morris A, Roberts S, et al. Guidelines for the Control of Methicillin-resistant *Staphylococcus aureus* in New Zealand. August 2002;1
- Colle JG, Fraser AG, Marmion BP, Simmons A. *Practical Medical Microbiology*. 14th. London: Churchill Livingstone; 1996. *Staphylococcus: Cluster forming Gram-positive cocci*, Mackie and McCartney.
- Colle JG, Fraser AG, Marmion BP, Simmons A. *Practical Medical Microbiology*. 14th. London: Churchill Livingstone; 1996. *Specimen collection, culture containers and media*, Mackie and McCartney.
- Coia JE, Thompson-Carter F, Baird DR, Platt DJ. Characterization of Methicillin resistant *Staphylococcus aureus* by biotyping, immunoblotting and restriction enzyme fragmentation patterns. *Journal of Medical Microbiology.* 1990 Feb;31(2):125–32.

7. Bauer AW, Kirby WMM, Sherris JC, Turck M. Antimicrobial susceptibility testing by a standardized single disc method. *Am J Clin Path.* 1996;41:493–96.
8. Clinical and Laboratory Standards Institute. Approved standard: M02- A10. Performance standards for antimicrobial disk susceptibility tests. 10th. Wayne, Pa.: Clinical and Laboratory Standards Institute; 2009.
9. Vinodhkumaradithyaa A, Uma A, Srinivasan M, Ananthalakshmi I. Nasal carriage of Methicillin –Resistant *Staphylococcus aureus* among surgical unit staff. Institute of Madurai Medical College, Madurai. *Jpn J Infect Dis.* 2009;62:228–29.
10. Shobha KL, Rao PS, Thomas J. Survey of *Staphylococcus* isolates among hospital personnel, environment and their antibiogram with special emphasis on methicillin resistance. *Indian J Med Microbiol.* 2005;23(3):186–88.