

Methicillin Resistant Staphylococcus Aureus Prevalence of Nasal Carriage among Healthy MBBS Students of Continental Medical College, Lahore

ARSLAAN JAVAIED¹, SHAFQAT HUSNAIN KHAN², RIAZ-UL-HAQSUBHANI³, SANNIYA KHAN GHOURI⁴, SHAH JAHAN⁵

ABSTRACT

Aim: The objective of this study was to evaluate the prevalence of MRSA carriage among healthy medical students.

Duration: January 2016 to June 2016

Settings: Department of pathology, Continental Medical College Lahore, attached with Ch. Rehmat Ali Memorial Trust Teaching Hospital.

Method: A total of 200 healthy medical students (male and female) were included in this study. Nasal swabs were taken and further processed for identification and antibiotic sensitivity.

Results: The results of our study show that 39 (19.5%) were positive for *S. aureus* among them 11 (5.5%) were carriers of MRSA. So it is concluded that nasal carriage of MRSA exists in medical students. *S. aureus* was higher among males while MRSA carriage was more in females.

Conclusion: It is concluded that nasal carriage of *S. aureus* and MRSA among medical students exists and that is worrisome because they can infect not only themselves but also others as well.

Keywords: *S. aureus*, nasal carriage, methicillin resistant

INTRODUCTION

Staphylococcus aureus is one of the major pathogen causing human sufferings in hospital settings as well as community. It is a nosocomial pathogen that has got resistance to different antibiotics in last decade. About 5 to 10 percent of nosocomial infections are caused by this organism leading to disease burden and cost. Besides to nosocomial infection it also resides in 20-25 percent of healthy population as carrier, which may cause severe disease in these individuals¹.

Irrational and indiscriminate use of antibiotics has led different including *staphylococcus aureus* to become resistant to different antibiotics. Before 1950 most strains of this organism were sensitive to methicillin and other penicillin. During this time the organism evolved different strains that become resistant to these antibiotics and the name came as methicillin resistant *staphylococcus aureus* (MRSA)².

With the passage of time it has emerged as one of the most difficult infection to be treated in the hospital and a public health concern. Different studies

have proved the nasal carriage of MRSA in food handlers, health care workers and students³.

Staphylococcus aureus causes different types of infections from superficial skin infections to septicemia. It is readily found in the nasal cavity of school going children as well as adults⁴.

Nasal carriage of *staphylococcus aureus* is an established risk factor that causes infection in humans and also increases human to human transmission.⁵ *Staphylococcus aureus* carriage by healthy individuals is a health concern. Research studies have proven that health care workers have increased carriage rate than other healthy individuals and students attending wars may be due to they acquire it from their working setup⁶. In our study we aimed at to evaluate the nasal carriage among medical students and its impact on health and disease.

MATERIALS AND METHODS

This study was conducted on 200 M.B.B.S students of Continental Medical Lahore during January 2016 to June 2016 in Department of Pathology. Among these students 120 were male and 80 female. The college is attached to Ch. Rehmat Ali Memorial Trust Teaching Hospital, which is a four hundred bedded hospital with all specialties. All participants in this study were volunteers and an informed consent was taken before taking nasal swabs. The subjects were 18 to 25 years old. 200 nasal swabs were taken and

¹Assistant Professor Histopathology, Poonch Medical College, Rawalakot, AJK.

²Sr. Demonstrator Pathology, Continental Medical College Lahore.

³Assistant Professor, Department of Pathology, Haematology Section, Continental Medical College Lahore.

⁴ER Resident, Agha Khan University Hospital Karachi

⁵Assistant Professor Immunology, UHS Lahore.

Correspondence to Dr. Riaz-Ul-Haq Subhani Email: rzsubhani@gmail.com Contact: 0345-8327314

then cultured for staphylococcus aureus and antibiotic sensitivity.

Inclusion Criteria: All included individuals were healthy individuals aged 18 to 25 years. These individuals were not hospitalized in last six months, they were not having any kind of flue or throat infection and direct to MRSA known patient. Both male and female students were included in this study.

Exclusion Criteria: The students that were hospitalized for any kind of illness in the past six months were not included in this study. Subjects having any kind of throat infection, flue and direct contact with a known MRSA patient were excluded from this study.

Sampling and Processing for Samples: All subjects were well informed and briefed about the procedure of taking the swabs. Disposable sterile cotton swabs were used and moistened with sterile distilled water. These were inserted 2-3 cm deep into the anterior nares and swabs were taken. Then specimens were further processed in the lab.

The nasal swabs were cultured on mannitol salt agar. The plates were incubated at 37C overnight. The growth was identified as *Staphylococcus aureus* on the basis of its specific colony morphology, Gram staining and biochemical tests i.e. catalase and coagulase tests.

After identification of *staphylococcus aureus* antibiotic susceptibility was determined by using Kirby Bauer's disc diffusion method. A 0.5 McFarland suspension of the organism was made. A lawn was made on Muller Hinton agar plate using sterile cotton swab. Oxacillin discs were applied to the agar and incubated it at 37C overnight. All procedures and readings were done according to the Clinical Laboratory Standard institute (CLSI) protocol. Discs of vancomycin were also applied to the plates to determine resistance to it. After incubation antibiotic sensitivity was checked and results were interpreted according to CLSI standards.

Statistical analysis: Antibiotic sensitivity measurements were done according to the CLSI. Data was collected and then presented in tabular form and percentages.

RESULTS

All 200 sample swabs were processed according to the CLSI guidelines. When cultured for *S. aureus* 39 samples showed growth of *S. aureus* and were confirmed on the basis of biochemical tests. This shows that 19.5% of the samples were positive for *S. aureus*. Sensitivity of these isolated organisms was then checked against oxacillin. All were sensitive to oxacillin except 11 samples that were resistant. This

shows that 5.5% samples carried MRSA. The results are shown in Table 1.

Male and female student's data was recorded separately as well. Out of 120 male students 23 were positive for *S. aureus* which corresponds to 58.97% of the total positive students. Among these 5 were MRSA amounting to 45.45%. Similarly 13 females were positive for *S. aureus* that is 33.33% of carriers, among them 6 were harboring MRSA in their nares that accounts to 54.54% of total MRSA. The results are shown in table 2,3:

Number male students carrying *S. aureus* was higher than females while MRSA was higher in females as compared to males.

Table 1: Results

Total participants	200
No. of <i>S. aureus</i> isolated	39
Percentage of <i>S. aureus</i> isolated	19.5%
No. of MRSA isolated	11
Percentage off MRSA isolated	5.5%

Table 2: Number and %ages of female *S. aureus* and MRSA

Total participants	200
No. of female participants	80
<i>S. aureus</i> positive	13
Percentage of <i>S. aureus</i> positive	33.33%
Number of MRSA	6
Percentage of MRSA	54.54%

Table 3: No. and %ages of male *S. aureus* and MRSA

Total participants	200
No. of male participants	120
<i>S. aureus</i> positive	16
Percentage of <i>S. aureus</i> positive	58.97%
Number of MRSA	5
Percentage of MRSA	45.45%

DISCUSSION

Nasal carriage of MRSA in M.B.B.S students is cause of concern because these are our future doctors and will be working in different capacities in hospitals, treating patients, interacting with colleagues, doing social work in society and the most will be with their dear ones. Therefore it is crucial to know about the carriage of MRSA. They can not only infect themselves but also those who are in close contact with them⁷.

Therefore, present study was conducted to know the nasal carriage rate among students of medical college. In our study nasal carriage rate among students was 19.5% and MRSA was 5.5%. Although MRSA rate was not very high it is worrisome because they can spread the disease. Another study conducted reflects that nasal carriage rate among health care workers was 20%, which is close to our

study.⁸ This study supports the results of our study. Similarly the MRSA nasal carriage in our study is 5.5%. In another study conducted in Ethiopia MRSA nasal carriage rate in health care workers came out to be 12.7% is higher than our study. This can be explained in a way that students less exposed to patients and spend less time in hospitals as compared to health care workers⁹.

The results of a study conducted in Nepal show that nasal carriage rate of *S. aureus* was 15.7% and MRSA 3.4 percent which is lower than our study. However the rate of carriage in this study is lower than the previously reported studies¹⁰. A review study conducted in Europe concludes the MRSA rate among health care professional to be 1.8%, which is lower than our study¹¹. Therefore, nasal carriage of *S. aureus* and MRSA differ in different settings worldwide that may be due to the measures taken to control the infection and their effective implementation. Likewise MRSA rate also varies in different places. This should be minimized with effective efforts of the health care settings and workers.

CONCLUSION

It is concluded that nasal carriage of *S. aureus* and MRSA among medical students exists and that is worrisome because they can infect not only themselves but also others as well. They should be educated about it and steps should be taken to eradicate the colonization and spread of the infection. It is suggested that more studies should be conducted like this and should be compared at national level as well as internationally. Effective measure should be taken to control the infection.

REFERENCES

1. WHO. Emerging and other Communicable diseases; Surveillance and Control. <http://apps.who.int/medicinedocs/documents/s16211e/s16211e.pdf> (accessed 21 June 2016).
2. Anthony Harris. *Patient information: Methicillin-resistant Staphylococcus aureus (MRSA) (Beyond the Basics)*. <http://www.uptodate.com/> (accessed 21 June 2016).
3. Assafi MS, Mohammed RQ, Hussein NR. Nasal Carriage Rates of Staphylococcus aureus and CA-Methicillin Resistant Staphylococcus aureus among University Students. *Journal of Microbiology Research* 2015; 5(4).
4. Dinic M, Vukovi S, Kocic B, Dordevic DS, Bogdanovic M. Nasal carriage of Staphylococcus aureus in Healthy Adults and School Children. *Scientific Journal of the Faculty of Medicine in Nis* 2013; 30(1).
5. Sharifi-Mood et al.,. Nasal carriage of methicillin-resistant staphylococcus aureus among ICU personnel working at Zahedan University, southeastern Iran. *Caspian J Intern Med* 2013; 3(3).
6. Ciftci Z et al., Does Attending Clinical Wards Increase Nasal Carriage of Staphylococcus Aureus Among Medical Students?. *Medical Science and Discovery* 2015; 2(5).
7. Yassin NA, Hassan OA. Nasal Carriage of Methicillin – Resistant / Sensitive Staphylococcus aureus among Students in Faculty of Medical Sciences, Duhok University. *Advance Tropical Medicine and Public Health International* 2013; 3(2): 65-72.
8. Sah P, Rijal K R, Shakya B, Tiwari BR, Ghimire P. Nasal Carriage Rate of Staphylococcus aureus in Hospital Personnel of National Medical College and Teaching Hospital and their Antibiotic Susceptibility Pattern. *JHAS* 2013; (3): 21-23.
9. Shibabaw A, Abebe T, Mehrit A. Nasal carriage rate of methicillin resistant Staphylococcus aureus among Dessie Referral Hospital Health Care Workers; Dessie, Northeast Ethiopia. *Antimicrobial Resistance and Infection Control*, 2013; 2(25).
10. Khanal et al. Nasal carriage of methicillin resistant Staphylococcus aureus among health care workers at a tertiary care hospital in Western Nepal. *Antimicrobial Resistance and Infection Control* 2015; 4(39).
11. Dulon M, Peters C, Schablon A, Nienhaus A. MRSA carriage among healthcare workers in non-outbreak settings in Europe and the United States: a systematic review. *BMC Infectious Diseases* 2014; 14(363).