

Comparative Study On Prevalence Of Nasal Carriage Of MRSA And MSSA In Medical Students With Clinical Posting And Without Clinical Posting: Is Introduction Of Hospital Infection Control Policy In Medical Curriculum Need Of Hour

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Abstract: Infections caused by Methicillin-resistant *Staphylococcus aureus* (MRSA) is a growing problem. Medical students are at risk of getting infected by MRSA during their training due to exposure with infected patients and may be a source of transmission for other patients. Therefore it may be important to know nasal carriage of MRSA among medical students going for clinical posting. This prospective study done on 141 medical student who are already going for clinical posting and 125 medical students who still have not started clinical posting were screened for the nasal carriage of *Staphylococcus aureus*. Swabs from anterior nares were inoculated on mannitol salt agar and blood agar. The participants were also given a questionnaire. MRSA screening was performed on Muller Hinton Agar by disc diffusion method using cefoxitin and oxacillin. The prevalence of nasal carriage of *Staphylococcus aureus* in students with clinical posting was 29 out of 141 (21%). Out of these, 3 (10%) were MRSA producer. Overall prevalence of MRSA was 3 out of 141 (2.1%). Rest 112/141 (79.4%) were CoNS in which 9 (6.3%) showed resistance to cefoxitin. Contrary to it none of medical student without clinical posting showed MRSA or cefoxitin resistance. The carriage of MRSA in medical students with clinical postings highlights the need for introduction of infection control policies in medical curriculum.

Keywords: Medical Students, Mrsa, Clinical Posting, *Staphylococcus Aureus*

I. Introduction

Staphylococcus aureus (SA), is one of the most frequently encountered community- and hospital-associated pathogens. It causes spectrum of diseases ranging from mild skin infection to fulminant septicemia [1-3]. The emergence of methicillin-resistant SA (MRSA) strains has further raised alarm, which was first considered to be confined to hospitals and medical centers, but nowadays is increasingly presenting in community settings.

The main ecological niche for *S. aureus* is the anterior nares. Approximately 20% of individuals are persistently nasally colonized with *S. aureus*, and those intermittently colonized are 30%. Colonization is an established risk factor for subsequent infection. Colonization provides a reservoir from which bacteria can be introduced when host defences are breached, whether by surgery, aspiration, insertion of an indwelling catheter, or simply by shaving. In a study of bacteremia, blood isolates were identical to nasal isolates in 82% of patients [4]. Not only colonization is an endogenous reservoirs for overt clinical infections, but it also serves as a source of transmission to susceptible individual [5].

Asymptomatic carriage of SA in healthy individuals has been shown to have a high prevalence, especially in children, young adults, and healthcare workers [6-8]. Risk factor for health care workers are frequent exposure to, and physical contact with patients colonized with MRSA [9,10]. Evidences are there to suggest there is increase in carriage of MRSA among hospital personnel as exposure to the hospital environment increases [11]. Medical students is an important section of health care workers who are exposed to different patients and are thus at potential risk of being colonized by different pathogens including SA. These students can then spread the infection to other patients, other individuals in community and are also at risk of themselves suffering from disease [12]. Nasal carriage rates of SA in medical students has been evaluated in different studies in Colombia [13] and Brazil [14] and around the world [15-18]. Some of the published studies further raised concern, as they reported that nasal colonisation of SA increased with greater exposure of students to the hospital environment [15,18]. Therefore, we undertook this study to assess the prevalence of MRSA among the medical students, stratified by pre-clinical and clinical groups, in Agra.

The objective of the present study was to determine the MRSA carriage rate among medical students and compare it with the MRSA carriage rate of a control group.

II. Material And Method

This prospective study was conducted over a period of 6 months from september 2014 to february 2015 in department of microbiology, SN Medical college, Agra . 141 medical students with clinical posting and 125 medical students without clinical postings were screened for MRSA colonization.

A preformatted questionnaire was filled by medical students about their demographics and medical history. Sterile cotton wool swabs, moistened with sterile normal saline were used to collect specimen from both the anterior nares of all students and were inoculated on mannitol salt agar and blood agar . *S. aureus* was identified by Gram's stain, catalase, mannitol fermentation and coagulase test. MRSA screening was performed on Muller Hinton Agar with cefoxitin and oxacillin by disc diffusion method .

III. Results

29 (20%) medical students with clinical posting, were screened positive for *Staphylococcus aureus* and remaining 112 (77%) were screened positive for coagulase negative staphylococcus cases. Amongst 29 medical students 14 students were male and 15 were female. Out of the 29 isolates of SA in students with medical posting, 3 (2.1%) isolates were for positive methicillin resistance screening test. All the participants with MRSA/ cefoxitin resistance had no previous medical history of hospital admission .Moreover medical students with clinical posting also showed cefoxitin resistance in 9 (8%) coagulase negative staphylococcus cases. Only 20 (16%) out of 125 medical students without medical postings were found carrier for *Staphylococcus aureus* and rest 105 (84%) were carrier for CONS. Out of 20 students found carrier for *staphylococcus aureus* , 9 were male and 11 were female students . However, none of the isolates were positive for methicillin resistance.

IV. Discussion

The reservoir for SA is anterior nares. It has been reported that certain strains of *S. aureus* have a special ability to colonise patients and staff of hospitals and that certain MRSA strains are among these [19]. Medical personnel have been traced as source of infection in many outbreaks of MRSA in hospitals [20]. We have assessed the prevalence of colonisation of MRSA among medical students and thus the possibility of its spread in hospital.

The present study showed nasal carriage of 20% *Staphylococcus aureus* with 2.1% MRSA among medical students with clinical postings and 16 % *Staphylococcus aureus* with no MRSA among medical students without clinical posting. The higher carrier rate of SA and MRSA among medical students with clinical posting could be explained by the contact of this set of medical students with the patients, thereby establishing the fact that clinical positing increases the risk of *Staphylococcus aureus* as well as MRSA colonization among medical students. This is in correlation with other studies.

The carrier rate of *staphylococcus aureus* amongst the two group was similar to other studies. Data reported in similar type of study by Nordin SA et al [21] showed a high risk of prevalence of *Staphylococcus aureus* among medical students with clinical posting but no MRSA was isolated from medical students without clinical postings. Ganoa et al[22] reported that 1.3% of medical students in clinical rotations carried MRSA strains in their nares. In Brazil, Prates et al.[24]reported that the prevalence of MRSA nasal carriage in university students was 2.4%.

The Male / Female ratio in both students with clinical posting and without clinical posting showed non-significant difference in carriage of *Staphylococcus aureus*. However study by Bischoff et al found that male gender was significantly associated with SA colonization [24].

Several publications have shown that, the elimination of nasal carriage reduced the incidence of *S. aureus* infections[25,26] International guidelines recommend local therapy with mupirocin to eliminate MRSA nasal colonisation in certain groups of patients and health-care workers colonized with MRSA[27]. However, this antibiotic is only effective at removing the bacterium from the nose over a few weeks, and recolonisation often occurs after therapy is discontinued[28].Another drawback observed is the increasing trend in resistance of mupirocin and the subsequent decrease in effectiveness [29,30].

Therefore, it becomes essential to teach medical students about standard practices on hand hygiene, infection control and additional precautions at the beginning of their clinical formation and again in between there clinical postings. The reinforcement of these measures would probably lead to its larger application. Students should also be encouraged to participate in educational sessions on hand hygiene and standard precautions for proper handling of patients, so as to reduce spread of the bacterium and to reduce the risk of infection in susceptible patients.

V. Conclusion

Presence of MRSA nasal carriage among medical students who have started their medical posting in contrast to complete absence in students who have not started their training yet, showed a significant difference .This significant difference in these two groups indicates risk potential in the hospital settings. This warrants an alarm which requires inclusion of infection control policy as necessity in medical curriculum.

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