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Archives of Applied Science Research, 2013, 5 (1):167-171  
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## Nasal screening for MRSA among the health care workers of a tertiary care hospital of North Kerala

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### ABSTRACT

MRSA is a common nosocomial pathogen that causes the infections in the intensive care units and other parts of the hospital it is important we screen our staff for nasal carriage of MRSA as it could help to control the spread of this pathogen from the health care workers to the patients as reported in some studies world over. Determine the prevalence of nasal MRSA colonization in health care workers in our institution and to determine the effectiveness of mupirocin in decolonizing the MRSA. The ethical committee permission was taken for conducting this study, and all study participants were provided with informed and written consent. The health care workers, included nurses, physicians, and technicians from each person nasal swabs were collected from anterior nares and subjected to culture, biochemical testing and susceptibility testing with the oxacillin disc by disc diffusion method as per the CLSI guidelines. We measured the proportion of health care workers testing positive for nasal MRSA colonization and calculated 95% confidence intervals (CIs) by using the epi info biostatic software. The prevalence of nasal colonization with MRSA was 5.8% (95% confidence interval 2.54% to 11.10%). with MSSA was 10.87% (95% confidence interval 6.21% to 17.29%). Sex wise: males 6.06% , females 5.71% .Profession wise: Nurses 62.5% followed by Technicians 37.50%. After treatment with mupirocin repeat three swabs were negative . Surveillance for MRSA and eradication of the carrier state reduces the rate of MRSA infections and mupirocin was found to be effective in decolonizing nasal MRSA colonization in our study

**Key words:** Colonization; Infection; Methicillin resistance; *Staphylococcus aureus*

### INTRODUCTION

*Staphylococcal* infections especially those caused by MRSA significantly increase the morbidity and mortality in both the community and hospital settings[1-3]. Treatment of infection caused by *S.aureus* has become more problematic since the development of antimicrobial resistant *Staphylococcus aureus* (MRSA)[3]. Since MRSA strain are resistant to all  $\beta$ -lactam antibiotics and the treatment options are limited significantly. The incidence of nosocomial infection caused by MRSA continues to increase worldwide[1, 2]. Infections caused by MRSA strains are associated with longer hospital stay, prolonged antibiotic administration and higher costs than infections caused by methicillin – susceptible *Staphylococcus aureus* (MSSA) strains. The presence of *S.aureus* in the anterior nares of health care workers may serve as a source of infection to patients, is known to be a significant risk factor[3, 4]. Identification of healthcare workers colonized with MRSA, combined with other precautions and taking care of hand hygiene have been helpful in reducing transmission and controlling spread[5]. MRSA has been implicated in

both community acquired and hospital acquired infections. This formed the basis for our study and its importance of screening for healthy carriers of MRSA,

**MATERIALS AND METHODS**

We conducted a prospective study on a convenience sample of health care workers to determine the nasal MRSA colonization rate. Our study setting was a tertiary care community teaching hospital in north Kerala with approximately 300 health care workers including (doctors, nurses, and technicians). The study period was from June 2011 to Dec 2011. The ethical committee of the institute approved the study, and all study participants provided informed consent.

*Selection of participants*

Study participants consisted of a convenience sample of health care workers working in various departments of the hospital and who were willing to undergo nasal swab testing. The health care worker study group included doctor’s nurses, technicians. Subjects were selected by the department of infection control of the institute.

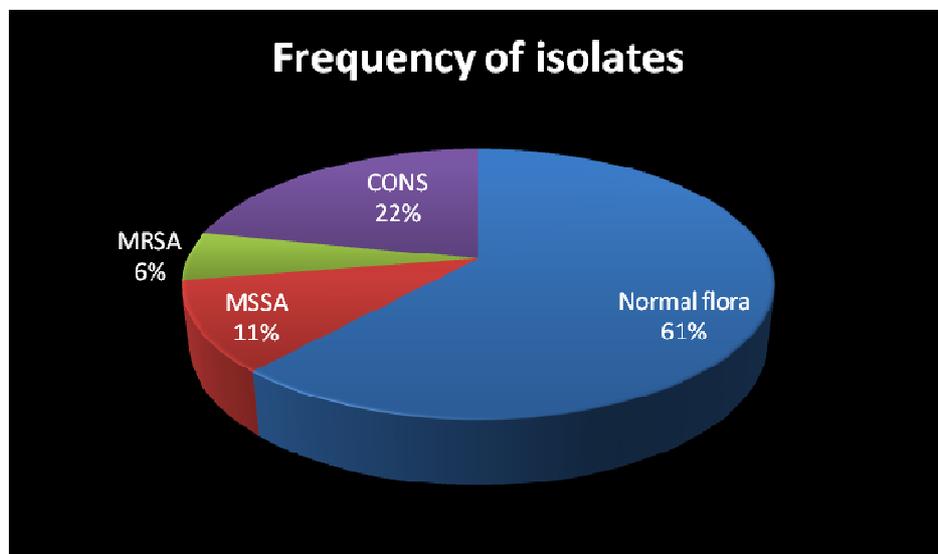
*Sample collection and transport*

The samples were collected from the anterior nares by Wiping a swab around inside rim of patient’s nose for 5 seconds[6]. Then the swabs were transported immediately within 30 min to microbiology lab for processing

*Sample processing*

The swabs were immediately processed by inoculating them on 5% sheep Blood agar and the plates were incubated aerobically at 35-37°C in the presence of 5-10% CO<sub>2</sub> for a period 16-24 hrs and read after 24 hrs . The colonies growing on the blood agar were confirmed as coagulase positive staphylococci by its colony morphology and by doing the coagulase test. If culture was negative for *Staphylococcus aureus*, plates will be reincubated for an additional 24 hours. For 20-24 hours. Oxacillin disk diffusion screening was performed using a 1µg oxacillin disk respectively for 18-24 hour growth cultures inoculated to Mueller-Hinton agar and incubated for 24 hours at 35°C. Interpretation was according to CLSI guidelines[7].

Fig 1



**RESULTS**

Out of the 138 health care workers screened for nasal carriage of MRSA 8 were positive .The prevalence of nasal colonization with MRSA was 5.8% (95% confidence interval 2.54% to 11.10%). with MSSA was 10.87% (95% confidence interval 6.21% to 17.29%) as shown in fig1.Sex wise: out of 109 females 6 were positive( 5.71% ) and

out of 29 males 2 were positive (6.06%) for nasal colonization of MRSA as shown in fig 2 .Profession wise: out of 110 Nurses screened 5 were positive (4.54%) , 22 technicians screened 3 were positive (13.6%). Departments wise , NICU 12 were screened 3 were positive (25%), SICU 5 were screened 1 positive (20%), in cath lab 11 were screened 1 was positive (9.09%), general wards 27 were screened 2 were positive (7.4%) and MICU 36 were screened 1 was positive (2.7,) as shown in fig3. Age wise: All the 8 isolates of MRSA were from the age group 20-30 yrs as shown in fig 4. After treatment with 2% mupirocin ointment 3 times a day for 5 days [6] the repeat nasal swabs were negative

Fig2

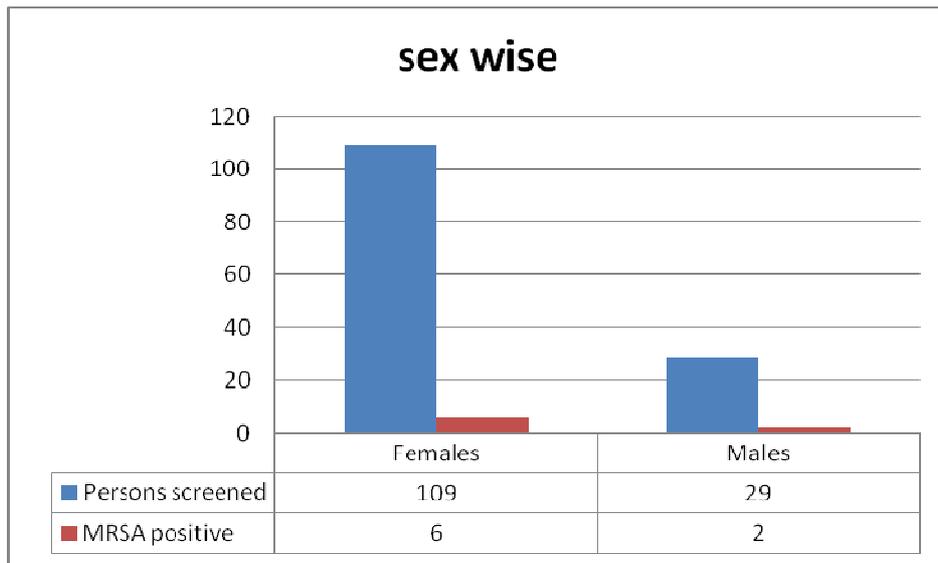


Fig3

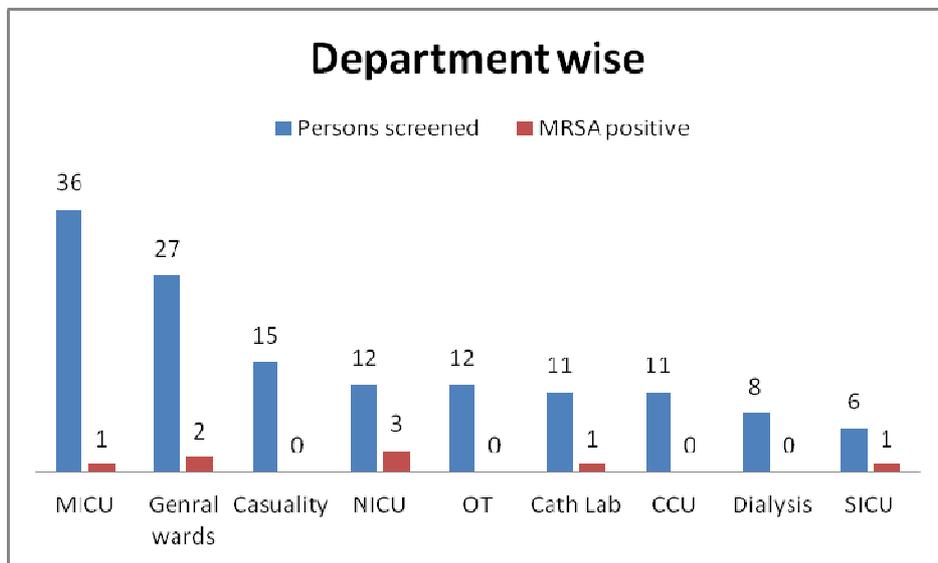
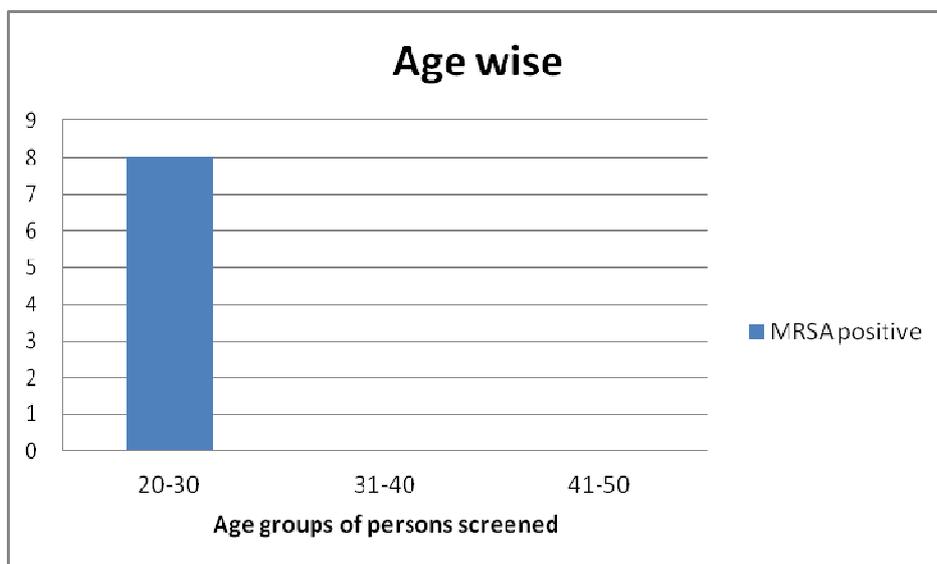


Fig 4



### DISCUSSION

MRSA is now playing an important role in causing the infections in the hospitalised patients as well as in the community at a large and the main sources of spread of infection in the hospital setup are the health care workers and the patients colonized with MRSA mainly in nose or on the skin[8] and patients themselves through their hands are through nasal secretions, if proper hand hygiene and other infection control measures are not adapted then these infections can spread very fast among the patients and this could increase their duration of stay in the hospital and also increased financial burden on both the patient and the hospital authorities therefore routine screening methods have to be followed for detecting the colonization of MRSA in the health care workers and also the patients

The present study provides an outlook on the prevalence of nasal carriage of MRSA among the health care workers in our institute. Out of the 138 health care workers screened the prevalence of MRSA was 5.8% (95% confidence interval 2.54% to 11.10%) it was slightly higher than reported by Brian P. Suffoletto *et al*[9],(4.3%) Werner C Albrich *et al* (4.6%)[10]lower than that reported by sujatha *et al*[11](8.5%), april bisaga *et al*[12](15%), Jonathan Wet *et al*[13] (21%).. Sex wise it was more prevalent in males (6.06%) when compared to females (5.71%) correlating with the studies conducted by s sujatha *et al*[11] which reported in males(12.4%) and females (2.4%). among the different departments screened the highest percentage of isolation depending on the number of persons screened was highest in NICU (25%) followed by SICU (20%), in cath lab 11 were screened 1 was positive (9.09%), General wards (7.4%) and MICU (2.7%). Department wise screening does not show the real prevalence as all the staff were not screened it may vary profession wise depending on the number of persons screened it was among the technicians (13.6%) followed by nurses (4.54%) it is statically not so significant as many staff from one group were involved when compared to others as also reported by april bisaga *et al*[12]

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