Nasal Colonization rate of *Staphylococcus aureus* strains among Health Care Service Employee's of Teaching University Hospitals in Yazd

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Abstract- This study was carried out to find the extent of staphylococcal carriages including Methicillin resistant *Staphylococcus aureus* MRSA in employee's of teaching university hospitals in Yazd. Nasal swabs of 742 employees in four different medical teaching hospitals in Yazd were collected, and tested for detection of staphylococci strains. Out of 742 employees, 94 (12.7%) were carrier of *staphylococcus aurus* and 57 (11.38%) for methicillin resistant *Staphylococcus aureus* (MRSA) respectively. Prevalence of *Staphylococci aureus* and MRSA in individual hospitals and wards were different. In general the highest carriers were personnel of dialysis ward and the lowest pediatrics wards. Resistance rate of MRSA against Ciprofloxacin, Vancomycin, and Rifampin were found to be as 28.1%, 10.5% and 35.1% respectively.

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Introduction

Hospital personnel can serve as reservoirs for MRSA and may harbor the organism for many months. *S.aureus* is a major cause of infection associated with health care, accounting for approximately 20% of surgical wound infection, and the second most common cause of all nosocomial infection (1-3). It is estimated that about 2 billion people carry some from of *S.aureus*, and up to 53 million carry Methicillin resistance S. aureus (4). People infected with antibiotic-resistant organisms like MRSA are more likely to have longer and more expensive hospital stays, and may be more likely to die as a result of the infection.Unfortunately, as soon as methicillin was used clinically, methicilin resistance *S.aureus* (MRSA) was isolated (5, 6). MRSA are isolates of the *S.aureus* that have acquired genes encoding antibiotic resistance to all Penecillins, including methicilin and other narrow-spectrum β-lactamase-resistance Penecillin antibiotics (7). Vancomycin and teicoplanin are antibiotics to treat MRSA infections. Although this drug is inconvenient in rout of administration and posses low efficacy, several new strain of MRSA have been found showing resistance to it (8, 9). The objective of this study was to find out the prevalence of staphylococcal carriages among 742 health care workers at four different university teaching hospitals, as well as the susceptibility Potential of all methicillin resistance against other selected antibiotics.

Patients and Methods

Nasal swabs of 742 employees in Yazd medical teaching hospitals were collected, and tested for detection of staphylococci strains. The specimens were cultured on Blood and and Manital Salt Agar for 24-48 hours at 37°C. *Staphylococcus aureus* isolates were identified by colony morphology, catalase, coagulase and DNase tests (10). Methicillin resistance was identified by modified Kirby-Bauer disk diffusion technique using 1 g oxacillin disk and confirmed by oxacillin screen agar test according to NCCLS guidelines. The susceptibility of isolated MRSA strains against other selected antibiotics such as ciprofloxacin, vancomycin and refampicin was determined. The results were analyzed using SPSS Program.

Results

Out of 742 employees, 94 (12.67%) were positive for *S.aureus* and 57 (7.6%) for MRSA. 36 out of 233 (15.4%) and 17 out of 233 (7.3%) of *S.aureus* and MRSA positive were men whereas 58 out of 509

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(11.39%) and 40 out of 509 (7.86%) were women respectively (*P*=0.11), as are shown in table 1.

When the data was analyzed according to personnel's of individual hospitals ,the prevalence of both *S.aureus* and MRSA were found to be significantly higher in Shahid Rahnemoon hospital with 19.43% and 13.14% respectively (*P*=0.04), (Table 2).

Data obtained from personnel's in accordance to their related wards, showed that highest rate of *S.aureus* carriers (31.25%) were employees of dialysis ward, table 3.

Table 1. Prevalence of S.aurus and MRSA among 742 hospital employees

Gender	SA+	MRSA+	total
Men	36/233(15.4%)	17/233(7.30%)	233(100%)
Women	58/509(11.39)	40/509(7.86)	509(100%)
Total	94/742(12.67)	57/742(7.6%)	742(100%)

Table 2. Prevalence of S. aureus and MRSA among the personnel's of individual

Hospital	SA+ (%)	MRSA+ (%)	Total
Shahid Sadughi	34(10.10)	22(6.53)	337
Shahid Rahnemoon	34(19.42)	23(13.14)	175
Afshar	21(11.41)	10(5.43)	184
Accidents and burns	5(10.87)	2(4.34)	46
Total	94(12.67)	57(7.68)	742(100%)

Table 3. Prevalence of S.aureus and MRSA in relationship with hospital's wards

wards	SA+ (%)	MRSA+ (%)	total
CCU	22(14.57)	12(7.95)	151
ICU	6(8.33)	2(2.8)	72
surgery	9(13.85)	6(9.23)	65
emergency	5(17.24)	5(17.24)	29
hospital Lab	10(21.28)	5(10.64)	47
Operating room	6(5.28)	4(3.48)	115
gynecology	6(16.21)	5(13.51)	37
radiology	12(23.53)	9(17.65)	51
pediatrics	4(14.29)	1(3.57)	28
endoscopies	2(28.57)	2(28.57)	7
dialysis	5(31.25)	3(18.75)	16
burns ward	2(7.14)	1(3.33)	30
internal	5(15.63)	2(6.25)	32
Total	94(12.67)	57(7.68)	742(100%)

Discussion

Staphylococcus aureus is a frequent cause of nosocomial infections, including bacteremia and wound infections. Approximately twenty-five percent of all nosocomial infections are caused by S. aureus, affecting both surgical and non-surgical patients, and leading to increased hospital stay, antibiotic use, costs, and mortality. Nasal carriers of S. aureus have an increased risk of developing these infections. Recent data show that eighty percent of nosocomial bacteremic S. aureus strains are endogenous and similar to the strain from the nose of S. aureus carriers.The frequency of MRSA (12 to 15 %) in our study samples is similar to that observed in the studies by Mansori et al (11) and Davood Zadeh (12) who reported of 12% and 10.4% of SA from person ells of general hospital in cities of Kerman and Khoram Abad . Rahber et al (13) and Alghaity et al (14) in Suidi Arabia reported the rate of SA 40% and 25.4% but 35% and 18.3% for MRSA respectively. In addition, similar survey performed in Ghaem Shahr hospital personnel's(15) showed the rate of 36% SA and 5.5 % MRSA ,while reports from western countries such as France (16) and Spain (17),shows very high rate (45.4%, 34.9%, 7% and 38%, 84%) for SA and MRSA respectively. This shows that the rate of prevalence among different hospitals is variable and may be due to high rate of patient's admission and, or busy emergency wards. In the present study, 10.5% of MRSA were found to be resistance for Vancomycin, compared with ciprofloxacin (28.1%) and rifimpacin (35.1%).

In general, inadequate antibiotic therapy is associated with poor outcome and particularly with bacterial resistance. Infection control measures are important for the effective control, prevention and treatment of infection. Inweregbu et al (19) suggest that shorter duration of treatment and correct dosage of antibiotic therapy can strongly reduce the selection pressure for resistant staphylococcal isolate.

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