

Nasal colonization with *Staphylococcus aureus* in Basra Medical and dentistry Students

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ABSTRACT- *Staphylococcus aureus* is one of the major human pathogen which has long been implicated in some life threatening condition. It can cause community acquired and hospital acquired infections. The infection usually proceeds by colonization of *S. aureus*. In addition to that the risk of healthy individuals to get the infection from the carriers (community acquired) is increasing problem. So in order to insurance a good quality of patients care continuous and regular surveillance schedule is essential. The aim of the study was to study the prevalence of *S. aureus* carrier frequency among students in Basra medical college and Basra Dentistry College. A total of 100 nasal swabs were collected. 50 swabs were from Basra medical student (32 male and 18 female) and 50 swabs were from Basra Dentistry students (33 male and 17 were female), were subjected to bacteriological investigation following standard protocol. *S. aureus* isolates were identified by mannitol fermentation and coagulase positivity. Highest nasal colonization rate was found among medical student (39.5%) while represented 18.4% in dentistry students ($P>0.05$). Highest positive rate was observed among male than female and in clinical student than the preclinical students of both college. In conclusion these results indicate that both dentistry and medical students might have been contaminated with *S. aureus* during clinical practice which may act as a source of infection to the other individuals which May leads to many complications like increase the rate of nosocomial infection and multiple drug resistance.

KEY WORDS- Nasal carrier, *Staphylococcus aureus*, medical students, dentistry students.

1. INTRODUCTION

Staphylococcus aureus is one of the commonest human pathogen causing nosocomial and community-acquired infections [1]. Nosocomial infections due to *Staphylococcus aureus* have become an increasing problem over the last four decades [2]. *S. aureus* have the ability to involved in a wide range of infections varies from minor skin infections to severe life threatening infections such as toxic shock syndrome and septicemia [3].

The anterior nares have been shown to be the main reservoir of *S. aureus* [1-3]. Colonization may be either temporary or persistent and may be at single or various body sites [3]. On epidemiological point of view, carriage of *S. aureus* in the nose appears to play an important role in spreading and persistency of infection [4]. Other sites of colonization are tracheostomy sites, wounds, sputum of intubated patients [4].

Contaminated hands and surfaces considered as the main source of spreading of colonized bacteria [3, 6] where it can live on for months.

The frequency of nasal carriage varies widely ranging from 20 to 65% in both patients and healthy population [6]. Carrier state may affect a healthy individuals which may act as endogenous source for infection as well as a source of cross colonization in both hospital and community acquired infection [6, 7]. The rate of *S. aureus* nasal colonization can be a marker of high risk for consequent infection [2, 7].

2. MATERIALS AND METHODS

A total of 100 nasal swabs were collected. 50 swabs were from Basra medical student (32 male and 18 female) and 50 swabs were from Basra Dentistry students (33 male and 17 were female).

The students from each college were divided into 2 groups: Group A represented students of grade 1, 2 and 3 while group B represent students in grade 4, 5 those who have frequent clinical sessions.

Samples were obtained from the of students anterior nares (a sterile swab wetted with sterile normal saline was inserted 2cm into both anterior nares and rotated it twice.

The identification of bacterial growth was carried out by inoculating the samples on mannitol salt agar (MSA) plates to get a yellow golden colonies of *S. aureus* and on blood agar to identify the hemolytic activity of bacteria which give Beta hemolytic zone, after a 24-48 hours of incubation at 37 °C.

Further identification of *S. aureus* was performed by Gram's staining to observe a gram positive bacterial cells arranged as clusters. Other confirmatory tests: catalase test, Coagulase test and API staph test.

Statistical analysis: Chi-square test was used to analyze the findings.

3. RESULTS

Table 1 the frequency of positive cultures among medical students and dentistry students.

Group	Positive culture for <i>Staphylococcus</i> species	negative culture for <i>Staphylococcus</i> species	Other growth	Total
Medical students	43 86%	5 10%	2	50
Dentistry students	38 76%	10 20%	2	50
Total	81	15	4	100

$\chi^2 = 1.975$

$P > 0.005$

The results obtained show that out of sixty medical college students sampled 43 (86%) had *Staphylococcus* species

colonization. Also, 38 (76%) of Dentistry students.

Sampled were seen to be colonization as shown in Table 1. The difference between the two groups, was statistically not significant.

Table 2 the frequency of *Staphylococcus* nasal carriage among groups

Groups	Bacterial growth		Total
	<i>S. aureus</i>	<i>S. epidermidis</i>	
Medical students	17 39.5%	26 60.4%	43
Dentistry students	7 18.4%	31 81.57%	38
Total	24	57	81

$$X^2 = 4.312$$

$$P < 0.005$$

Table 2 showed that *S. aureus* nasal carriage had been found in 39.5% of medical students, while in the dentistry students it was 18.4% only. This difference was statistically significant $P < 0.005$.

Table 3 Distribution of *S. aureus* carrier in association with sex.

Groups	<i>S. aureus</i>		<i>S. epidermidis</i>	
	Male	Female	Male	Female
Medical students	10 23.25%	7 16.27%	17 39.53%	9 20.93%
Dentistry students	4 10.52%	3 7.89%	19 50%	12 31.57%
Total	14	10	38	21

$$X^2 = 4.417$$

$$p > 0.005$$

In relation to gender, male participants were more colonized with *S. aureus* than the female in both groups and the difference was statistically not significant ($p > 0.005$).

Table 4 Distribution of *S. aureus* nasal carriage with preclinical and clinical students among the study population.

Groups	Preclinical	Clinical students	Total
Medical student	8 47.05%	9 52.9%	17
Dentistry students	2 28.57%	5 71.4%	7
Total	10	14	24

$$X^2 = 0.745$$

$$P > 0.005$$

S. aureus colonization was more in clinical than preclinical students 9(52.9%), 5(71.4%), 8(47.05%), 2(28.57%) among the medical and dentistry students respectively. The difference in percentage of nasal for both groups were statistically not significant $P > 0.005$.

4. DISCUSSION

The aim of the study was Since the carriage of *S. aureus* in the nares and on the skin contribute to the problem of nosocomial infections, medical students as nasal carriers of nosocomial strains remain a potential source of cross-infection in the hospital environment today [5].

This study highlights the significance of continuous education of hospital personnel and workers regarding cross-infection in order to help reduce costly and preventable death. In addition to that its details the effect of exposure to the hospital environment, contact with workers and the in patients on the nasal carriage of *S. aureus* among Basra medical students and Dentistry students.

The overall culture positive samples were 43 (86%) and (76%) among medical students and dentistry students respectively.

17 (39.5%) out of the 43 were *S. aureus* species while only, 7 (18.4%) out of the 38 culture positive sample of dentistry students found to be *S. aureus* this difference may be due to exposure of medical students to the hospital environments more than dentistry student where their major work places as outpatient works while the medical students became in close contact with patients, health care workers for long period [7, 9].

Variation in carriage rates in female subjects has been reported to be associated with estrogen levels in addition to that, usually female take care more than male regarding the close contact with patients and the hygienic actors [8].

The prevalence of nasal carriage was found to be similar in clinical and preclinical medical students because majority of medical students attended the causality units and being in contact with the patients in the hospital for training purpose, while this is not found usually among the dentistry students [7, 9, 10].

Although the prevalence of nasal carriage was found to be similar in the pre-clinical and clinical groups with no significant association due to small sample size.

In conclusion, these results indicate that both dentistry and medical students might have been contaminated with *S. aureus* during clinical practice which may act as a source of infection to the other individuals which may leads to many complications like increase the rate of nosocomial infection and multiple drug resistance.

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REFERENCES

- [1] E. Kirecci, A. Ozer, M. Aral, M. Miraloglu, "A Research of nasal methicillin resistant/sensitive *Staphylococcus aureus* and pharyngeal beta-haemolytic *Streptococcus* carriage in midwifery students in Kahramanmaraş, Eastern Mediterranean Region of Turkey" Ethiop. J. Health Dev.,

- Vol. 24, No. 1, pp. 57-60, 2010.
- [2] D.V. Santhosh, K.L. Shobha, I. Bairy, G. Rao, K.M. Anand, J. D'souza, "Nasal screening and survey of pre-clinical medical students from Malaysia for nasal carriage of coagulase positive MRSA and rate of nasal colonization with *Staphylococcus* species" J. Clin. Diagn. Res., Vol. 1, No. 6, pp. 494-499, 2007.
- [3] A. Pathak, Y. Marothi, R.V. Iyer, B. Singh, M. Sharma, B. Eriksson, R. Macaden, C.S. Lundborg, "Nasal Carriage and Antimicrobial Susceptibility of *Staphylococcus aureus* in healthy preschool children in Ujjain, India" Pathak et al., BMC Pediatrics, 10:100, 2010.
- [4] L.S. Kakhandki, B.V. Peerapur, "Study of nasal carriage of MRSA among the clinical staff and health care workers of a teaching hospital of Karnataka, India" Al Ameen J. Med. Sci., Vol. 5, No. 4, pp. 367-370, 2012.
- [5] B. Shakya, S. Shrestha, T. Mitra, "Nasal carriage rate of methicillin resistant *Staphylococcus aureus* among at National Medical College Teaching Hospital, Birgunj, Nepal" Nepal Med. Coll. J., Vol. 12, No. 1, pp. 26-29, 2010.
- [6] S. Citak, F.N. Bayazit, F. Aksoy, "Nasal carriage and methicillin resistance of *Staphylococcus aureus* in patients and hospital staff in a tertiary referral center setting" Afr. J. Microbiol. Res., Vol. 5, No. 13, pp. 1615-1618, 2011.
- [7] E. Stubbs, M. Pegler, A. Vickery, C. Harbour, "Nasal carriage of *Staphylococcus aureus* in Australian (pre-clinical and clinical) medical Students" J. Hosp. Infect., Vol. 27, No. 2, pp. 127-134, 1994.
- [8] V.D. Bennimath, C.C. Gavimath, P.B. Kalburgi, C. Kelmani, "Amplification and sequencing of *mecA* gene from methicillin resistant *Staphylococcus aureus*" Int. J. Adv. Biotechnol Res., Vol. 2, Issue 3, pp. 310-314, 2011.
- [9] B.N. Doebebling, "Nasal and hand carriage of *Staphylococcus aureus* in healthcare workers" J. Chemother. Vol. 6, Suppl. 2, pp. 11-17, 1994.
- [10] J. Kluytmans, A.V. Belkum, H. Verbrugh, "Nasal Carriage of *Staphylococcus aureus*: Epidemiology, Underlying Mechanisms, and Associated Risks" Clin. Microbiol. Rev., Vol. 10, No. 3, pp. 505-520, 1997.