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Bacterial Hand Contamination in Medical Students - A Possible Carriers of Nosocomial Infections

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I. Introduction

Hand washing by health care workers(HCWs) is the most important measure to prevent hospital acquired infection [1]. Unfortunately, HCWs' attention to hand hygiene recommendations is often poor [2]. Gloving is recommended as a barrier in protecting the HCWs to reduce the risk of contamination during contact with body fluids, mucous membranes or the injured skin of patients [3,4]. Health-workers hands by themselves, or after contact with patients, increase the risk of virus and bacteria transmission that are sometimes resistant to antimicrobial agents (AMA)(5). This is a two-way hazard that could be noxious to both patients and health-care workers, and which depends on the nature and frequency of contact with infectious materials,inoculum and prevalence of susceptible patients(5).

Recently, the Health Care Infection Control Practices Advisory Committee of the Centers for Disease Control and Prevention released new hand hygiene guidelines that promote use of hand washing practices among hospital personnels (6). The aim of the present work was to point out the hand bacterial colonization of medical students, the hand washing influence and the modifications regarding microorganism transportation after a patient physical examination.

II. Material & Methods

The study was conducted at Department of Microbiology,Government Medical College,Nagpur during November 2013 to September 2014**.** Swabs from the hands of 100 volunteer students of I MBBS (gr A)&100 volunteer students of II & III MBBS (grB) were taken. A sterile swab moistened with sterile demineralised water was rotated on the palmer aspect of the hand. The swabs were immediately inoculated and streaked onto nutrient agar, 5% sheep blood agar and MacConkey agar (Hi-Media, India) (6).Plates were incubated aerobically at 37˚C for 24 hours. Isolated organisms were processed & identified according to standard bacteriological technique (7). Antibiotic susceptibility testing was performed by Kirby-Bauer disk diffusion technique (8). The drugs used were as per the CLSI 2013 guidelines(9).

Observation:

Table1: Hand contamination rate of I ,II & III MBBS students

Number of I MBBS students with contaminated hands (n=100)(%)	Number of II & III MBBS students with contaminated hands (n=100)(%)
2 (02)	15(15)

Table 2: Organisms isolated from hands of I MBBS students (n=02):

S.no	Organisms	Number(%)
1	Coagulase negative staphylococcus	2(100)

All the above coagulase negative staphylococcus strains were sensitive to all the tested antibiotics .

Table 3 :Organisms isolated from hands of II & III MBBS students(n=15):

S.no	Organisms	Number (%)
1	Coagulase negative staphylococcus	11 (73.33)
2	S.aureus	1 (6.66)
3	Ps.aeruginosa	1 (6.66)
4	E.coli	1 (6.66)
5	Klebsiellae spp.	1 (6.66)
	Total	15(100)

Table 4: Resistance pattern of staphylococcocci of II & III MBBS

S.no	Drug	Number of resistant staphylococcus aureus (%)(n=1)	Number of resistant coagulase negative staphylococcus (%)(n=11)
1	**Ox**	0	0
2	**P**	1	0
3	**Ac**	0	0
4	**Ci**	0	0
5	**Cn**	0	0
6	**Cz**	0	0
7	**Cpm**	0	0
8	**C**	0	0
9	**R**	0	0
10	**G**	0	0
1	**E**	0	0
11	**Va**	0	0
12	**Lz**	0	0
13	**Of**	0	0
14	**Le**	0	0
15	**Pm**	0	0
16	**Co**	0	0

E-Erythromycin, Oxacillin, P-Penicillin, Ac–Amoxycillin-clavulanic acid ,Ci – Ceftriaxone, Cn – Cefoxitin,Cz-Cefazoline, Cpm-Cefepime, C-Chloramphenicol, R-Rifampicin, G- Gentamicin , E-Erythromicin, Va-Vancomycin, Lz – Linezolid , Of – Ofloxacin, Le – Levofloxacin, Pm- pristinomicin , Co-trimaxazole **.**

Table 4: Resistance pattern of E.coli & Klebsiellae spp.

S.no	Drug	Number of E.coli resistant to mentioned antibiotic(%)(n=1)	Number of Klebsiellae spp. resistant to mentioned antibiotic(%) (n=1)
1	A	0	0
2	Ac	0	0
3	Ce	0	0
4	Ci	0	0
5	Cfz	0	0
6	Cs	0	0
7	Nt	0	0
8	Tcc	0	0
9	Azt	0	0
10	G	0	0
11	Ak	0	0
12	Cf	0	0
13	Le	0	0
14	Pb	0	0
15	Ip	0	0

A-Ampicillin, Ac–Amoxycillin-clavulanic acid ,Ce- Cefotaxime, Ci – Ceftriaxone, Cfz - -Cefazoline, Cs - Cefaperazone, , Nt – Natilmicin,Tcc – Ticarcillin,Azt – Aztreonam, cf – ciprofloxacin,le-Levofloxacin, Pb-Polymymixin B, Ip- Imepenem.

III. Discussion

Hand contamination rate among II & III MBBS students was more i.e. 15 % as compared to that rate of only 2% among I MBBS students . This indicates the higher rate of hand contamination among medical students which is really a cause of concern. Khodavaisy et al 2011(10). reported 73.1 % rate of hand contamination of health care workers. Almost all studies concerning hand hygiene have indicated the frequent contamination of HCWs hands (11,12,13,14). Organism isolated from hands of I MBBS students was CONS which is a skin commensal but can cause infection under special circumstances. Although CONS were also isolated from II & III MBBS students but the organisms known to cause nosocomial infections such as staphylococcus aureus , E.coli ,Klebsiellae spp. & pseudomonas spp. were also isolated from hands of II & III MBBS students. And such a difference between hand contamination of I MBBS & II,III MBBS could be because of exposure of II & III MBBS students to hospital environment during their clinical postings. Our findings agree with the other data indicating an increased number of microbe specially with nosocomial pathogens(11,12,13,14).All the isolates isolated from hands of medical students were sensitive to all the tested antibiotics except one isolate of staphylococcus aureus which was found resistant to penicillin.But these sensitive organisms can acquire drug resistance in hospital environment leading to serious & difficult to treat infection to the patient.

Many online medical journal were reviewed but we could not come across such type of study. These further highlights the importance of our study in such a manner that hand hygiene practices should be impressed upon I MBBS students so that hand hygiene practices should be incalculated in future doctors.

IV. Conclusion

As hands of students exposed to hospital environment were highly contaminated with various types of bacteria known to cause nosocomial infections is observed in the present study. This suggests the potential of the hands in the transmission of infection from one patient to another patient during patient care and patient examination, which can result in community-acquired infections with possible public health implications and should be the cause of concern. This further implicates the use of frequent hand-washing in curtailing any potential disease transmission. So hand hygiene practices should be impressed upon medical students so that hand hygiene practices should be incalculated in future doctors.

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