Effect of Training on Hand Hygiene Among Medical Students of A Tertiary Care Teaching Hospital

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Abstract: *Hand hygiene is universally acknowledged to be the single most important measure to prevent cross transmission of microorganisms, as contaminated hands of hospital staff has been identified as a major factor in transmission of hospital-acquired infections.*
Our study aimed to improve the knowledge about hand hygiene and infection control among medical students and to study the effect of hand hygiene training given to them in tertiary care teaching hospital. A total of 301 medical students including undergraduates, interns and post graduates have undergone induction training on Hand hygiene. It was conducted at the beginning of their clinical postings. A pre session test and a post session test was conducted with the same questionnaire having 15 questions. Pre and Post-test marks were analyzed. Undergraduate students scored a mean±1SD pre-test score of 9.00±1.57 and post-test mean ±1SD score of 12.00±1.77, Internees scored a mean ±1SD pre-test score of 8.69 ±2.14 and post-test mean ±1SD was 11.51±1.9), postgraduate students scored a mean ±1SD pre-test score of 10.875 ±2.67 and post-test was 11.75±2.17. The difference in mean scores between pre and post-test was found to be statistically significant.
Our study clearly shows that there is a significant improvement in the knowledge levels among the medical students attending training programme. Hence, hand hygiene training sessions should be conducted with continuous monitoring and performance feedback to encourage students to follow correct hand hygiene practices and to imbibe it in their practice later in life.
Keywords : *Hand hygiene training, Medical students, education*

I. Introduction

The Health care-associated infections affect hundreds of millions of patients worldwide every year. Infections lead to more serious illness, prolong hospital stays, induce long-term disabilities, add high costs to patients and their families, contribute to a massive, additional financial burden on the health-care system and, critically, often result in tragic loss of life.[1] The medical community is witnessing global spread of multi-drug resistant infections, compounded by the paucity of new antimicrobials have necessitated a re-look into the role of basic practices of infection prevention in modern day health care. [2]

Hand hygiene is universally acknowledged to be the single most important measure to prevent cross transmission of microorganisms from one patient to another. [2] The transfer of microorganisms by the hands of hospital staff has been identified as a major factor in the transmission of hospital-acquired infections. [3, 4, 5] Hand hygiene is the cornerstone measure to ensure safe client care. [1, 6] Multiple factors influence hand hygiene performance, and its promotion is particularly complex in developing countries where limited resources and culture-specific issues can strongly influence practices. [1] Targeted, multi-faceted approaches focusing on system change, administrative support, motivation, availability of alcohol-based hand rubs, training and intensive education of HCWs and reminders in the workplace have been recommended for improvement in hand hygiene.[7]

Recent studies by Sjoberg S et al [8] and Rykkje L et al [9] support the fact that interactive educational programmes combined with free availability of hand disinfectants significantly increased the hand hygiene compliance.[8,9] A single lecture on basic hand hygiene protocols had a significant and sustained effect in enhancing hand hygiene compliance.[8] Trampuz et al also advocated simple training sessions for HCWs to be held in each ward to introduce the advantage of alcohol hand rubs over hand washing.[10] The present study also focusses on improvement in knowledge after imparting hand hygiene training to medical students.

II. Aim & Objective

To study the effectiveness of training given to improve the knowledge about hand hygiene and infection control among medical students of tertiary care teaching hospital.

III. Materials and methods

3.1 Study setting: Department of Hospital Administration, Kamineni Institute of Medical Sciences, Sreepuram, Narketpally. It is a multi-specialty teaching institution having 1090 beds, established in the year 1999 and

rendering healthcare services to a large population, mostly rural. The present study was approved by institutional ethics committee.

3.2 Study Design: Educational interventional study.

3.3 Study period: From April 2015 to June 2016

3.4 Methods: Total 301 medical students including 93 undergraduate students, 178 interns and 30 broad speciality post graduates had induction training on Hand hygiene. It was conducted at the beginning of their clinical postings. Informed consent was taken before the session. It starts with a pre session test having 15 questions followed by an introductory lecture on hand hygiene and its historical importance. Which was, later followed by orientation on the methods of Hand Hygiene i.e hand washing and hand rubbing, mentioning the appropriateness and importance of both the techniques. Videos simplifying the hand washing techniques were played at the end of the session. A post session test was conducted, in which the same questions were given as in the pre session test to evaluate the knowledge gained by the students through the sessions. The questionnaire was developed based on WHO-Questionnaire on hand hygiene and health care associated infections and ASC quality- Hand hygiene knowledge assessment questionnaire. Pre and Post-test scores were compared. Student t test was done to assess statistical significance. Data analysis was done using Statistical Package for Social Science (SPSS) package software version 20.

IV. Observations

4.1 A total of 93 undergraduate students were given hand hygiene training, their mean for pre-test calculated was 9.35 ± 1.57 and post-test calculated was 11.94 ± 1.77 with a statistically significant($P<0.001$) improvement in knowledge

Table 1: Questionnaire

1. In which of the following situations should hand hygiene be performed?
a. Before having direct contact with a patient
b. Before inserting an invasive device (e.g., intravascular catheter, foley's catheter)
c. When moving from a contaminated body site to a clean body site during patient care
d. After having direct contact with a patient or with items in the immediate vicinity of the patient
e. All of the above

2. If hands are not visibly soiled or visibly contaminated with blood or other proteinaceous material, which of the following regimens is the most effective for reducing the number of pathogenic bacteria on the hands of personnel?
a. Washing hands with plain soap and water
b. Washing hands with an antimicrobial soap and water
c. Applying 1.5 ml to 3 ml of alcohol-based hand rub to the hands and rubbing hands together until they feel dry

3. How do antibiotic-resistant pathogens most frequently spread from one patient to another in health care settings?
a. Airborne spread resulting from patients coughing or sneezing
b. Patients coming in contact with contaminated equipment
c. From one patient to another via the contaminated hands of clinical staff
d. Poor environmental maintenance

4. Which of the following infections can be potentially transmitted from patients to clinical staff if appropriate glove use and hand hygiene are not performed?
a. Herpes simplex virus infection
b. Colonization or infection with methicillin-resistant Staphylococcus aureus
c. Respiratory syncytial virus infection
d. Hepatitis B virus infection
e. All of the above

5. Clostridium difficile (the cause of antibiotic-associated diarrhea) is readily killed by alcohol-based hand hygiene products
True
False

6. What is the minimal time needed for alcohol-based hand rub to kill most germs on your hands? *(tick one answer only)*
a. 20 seconds
b. 3 seconds
c. 1minute
d. 10 seconds

7. Which of the following statements about alcohol-based hand hygiene products is accurate?
a. They dry the skin more than repeated hand washing with soap and water
b. They cause more allergy and skin intolerance than chlorhexidine gluconate products
c. They cause stinging of the hands in some providers due to pre-existing skin irritation
d. They are effective even when the hands are visibly soiled
e. They kill bacteria less rapidly than chlorhexidine gluconate and other antiseptic containing soaps

8. The MOST effective way to break the chain of infection is by
a. Performing hand hygiene
b. Wearing gloves.
c. Placing patients in isolation.
d. Providing private rooms for all patients.

9. You have redressed a patient's wound and now plan to administer a medication to the patient.
a. Remove gloves & perform hand hygiene before leaving the room.
b. Remove glove & perform hand hygiene before administering meds.
c. Leave the gloves on to administer meds.
d. Leave the medication on the bedside table to avoid having to remove gloves.

10. You need to wear a gown when working with a patient
a. If the patient's hygiene is poor.
b. If the patient has AIDs or hepatitis B
c. If you are assisting with medicine administration
d. If blood or body fluids may get on your clothing from a task you plan to perform.

11. Identify when the nurse should remove gloves and perform hand hygiene. Select all that apply
a. After wound care.
b. When you have completed all tasks for the patient.
c. When the specific task you put them on for is completed.

12. Your ungloved hands come in contact with the drainage from the patient's wound. To clean your hands
a. Wash them with soap and water.
b. Use an alcohol-based hand cleaner.
c. Rinse them and use the alcohol-based hand cleaner.
d. Wipe them with a paper towel.

13. After coming in contact with a patient on isolation, visitors are encouraged to:
a. Wear gloves before eating or handling food.
b. Leave the facility to prevent contamination of others.
c. Perform hand hygiene upon leaving the patient's room.
d. Use an empty room to talk with family members.

14. Which of the following is not associated with increased likelihood of colonization of hands with harmful germs?
a. Wearing jewelry
b. Damaged skin
c. Artificial fingernails
d. Regular use of a hand cream

15. The nurse implements airborne precautions for the patient with
a. Pulmonary tuberculosis
b. Typhoid
c. Malaria
d. Herpes

Table 2: undergraduate students (n=93)

	Mean	Standard deviation	Standard error of mean	P Value
Pre Test Score	9.00	1.57	.16	P<0.001
Post Test Score	12.00	1.77	.18	

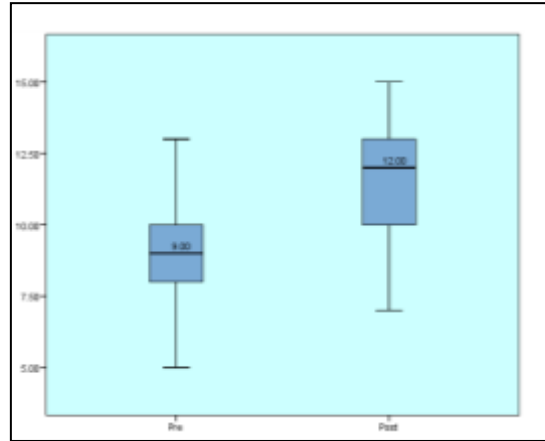T – Test is applied P value is significant if it is <0.05

Figure 1 : Box and whiskers plot of averages of undergraduate medical students

4.2 A total of 178 Internees were given hand hygiene training, their mean for pre-test calculated was 8.69 ±2.14 and post-test calculated was 11.51±1.96 with a statistically significant (P<0.001) improvement in knowledge

Table 3: Internees (n=178)

	Mean	Standard deviation	Standard error of mean	P Value
Pre Test Score	8.69	2.14	0.22	P<0.001
Post Test Score	11.51	1.96	0.20	

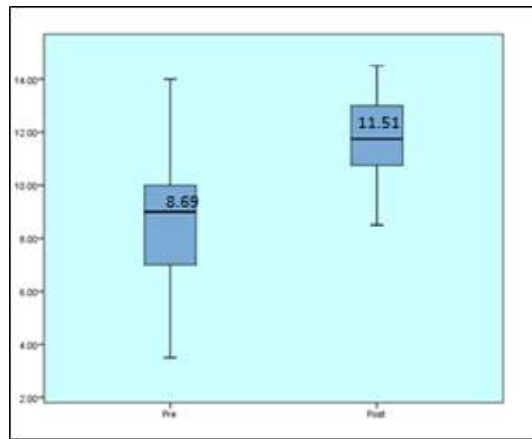T – Test is applied P value is significant if it is <0.05

Figure 2 : Box and whiskers plot of averages of internees

4.3 A total of 30 postgraduate students were given hand hygiene training, their mean for pre-test calculated was 10.875 ±2.67 and post-test calculated was 11.75±2.17 with a statistically significant (P<0.001) improvement in knowledge

Table 4: Post graduate students (n=30)

	Mean	Standard deviation	Standard error of mean	P Value
Pre Test Score	10.875	2.67	0.48	P<0.001
Post Test Score	11.758	2.17	0.39	

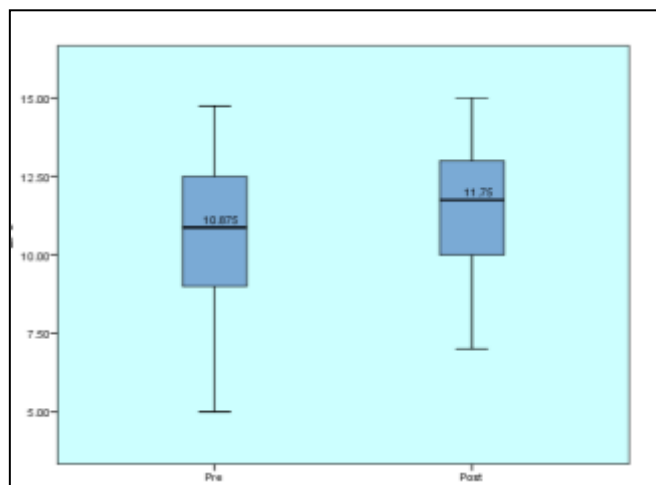T – Test is applied P value is significant if it is <0.05

Figure 3: Box and whiskers diagram of averages of post graduate students

V. Discussion

Sjoberg et al[8] in their study hypothesized that a lecture on basic hygiene routines could positively affect the staff's knowledge and attitudes thus leading to increase in the use of disinfectant for hand hygiene. It was observed that consumption of hand disinfectant increased by 93%. Nine months after the intervention, the consumption was still 21% higher than before the intervention. The result of the questionnaire showed that the employees considered themselves applying the disinfectant more thoroughly after the intervention. Some employees changed their perspective on basic hygiene routines after the lecture and stopped using watches and private clothes at work.

Rykkje L[9] also suggested that Hand washing should become an educational priority. Educational interventions for medical students should provide clear evidence that their hands become grossly contaminated with pathogens upon patient contact and that alcohol hand rubs are the easiest and most effective means of decontaminating hands and thereby reducing the rates of HAIs to continuous monitoring and effective data feedback are some of the important measures which need to be initiated in Indian hospitals.

Studies by Pittet [11] showed a remarkable and long lasting improvement in hand hygiene compliance using a multimodal strategy, which has been adopted by the first Global Patient Safety Challenge of WHO to develop hand hygiene strategies. They studied Effectiveness of a hospital-wide program to improve compliance with hand hygiene.

In our study, emphasis was more on imparting knowledge to medical students before the start of their postings with a view that knowledge will change behavioural pattern as compared to sjoberg et al and pittet. A total of 301 medical students including 93 undergraduate students, 178 interns and 30 broad speciality post graduates had induction training on Hand hygiene.

Undergraduate students scored a mean pre-test value of (9.00±1.57) and post-test mean value (12.00±1.77), Internees scored a mean pre-test value of (8.69 ±2.14) and post-test was (11.51±1.96), postgraduate students scored a mean pre-test value of (10.875 ±2.67) and post-test was (11.75±2.17) with a statistically significant ($P<0.001$) improvement in knowledge amongst all three groups.

VI. Conclusion

Our study clearly shows that there is a significant improvement in the knowledge levels among the medical students attending training programme. Hence, hand hygiene training sessions should be conducted with continuous monitoring and performance feedback to encourage students to follow correct hand hygiene practices and to imbibe it in their practice later in life.

Other factors like positive role modeling (hand hygiene behaviour of senior practitioners) and the use of performance indicators, adequate supply of hand hygiene products, lotions and creams, disposable towels and facilities for hand washing, where necessary also remarkably improve compliance to hand hygiene.
Apart from this, all hospitals should have a dynamic infection control team, robust surveillance system, and adequate staff to disseminate evidence-based knowledge in an easily comprehensible way to all cadres of staff.

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