

## EVALUATION OF HAND HYGIENE TRAINING AND ITS EFFECT ON MDR BACTERIA DETECTION IN VARIOUS INTENSIVE CARE UNITS OF ERA'S LUCKNOW MEDICAL COLLEGE.

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### ABSTRACT

Hand hygiene is nowadays considered as one of the most important measures to prevent transmission and acquisition of HCAs (health care associated infections). Monitoring hand hygiene compliance and providing healthcare workers with feedback regarding their performance are considered integral parts of a successful hand hygiene promotion programme. A total of 50 ICU staffs (resident doctors, faculty & nurses e.t.c.) were included in this interventional study. Baseline data of hand hygiene practices of all staffs and pre-intervention hand culture were obtained. Post intervention hand culture were taken after 30 days of training and interactive sessions as well as continuous availability of ABHR in the ICU. Results of post-intervention hand culture showed a marked decrease in isolation of bacteria specially those of MRSA and ESBL. MRSA was low by 35% and in non of the cases ESBL was reported. In all the ICUs frequency of hand hygiene was poor (average 31%) but improved significantly after intervention (70%). Introduction of ABHR was found to be an effective tool for improving hand hygiene. As a result of periodic training, monitoring, surveillance hand cultures and awareness generating campaign, transmission of resistant bacteria can be reduced, thus reducing the burden of nosocomial infection in a hospital set-up.

**KEYWORD:** Intensive care unit, Alcohol based hand rub (ABHR), Methicillin resistant Staphylococcus aureus (MRSA), Extended spectrum beta lactamase (ESBL).

### INTRODUCTION

Hands have been considered to be an unavoidable cause of transmission of infection to the patient as well as the health care workers as it remains to be the most important tool in the delivery of patient care. Handwashing is considered as the single most preventive method in the control of infection and policies related to hand hygiene should be strictly followed. The WHO has defined 6 key steps of hand washing as well as use of alcohol based hand rub (ABHR) for routine hand hygiene antiseptis. Patients in the intensive care units (ICUs) are mostly found to be colonized or infected by harmful and multidrug-resistance micro-organisms and most of these infections are spread by carriage of microorganisms through the health care workers. Despite of various hand hygiene recommendations, there are evidences of presence of various multi-drug resistant bacteria like, Methicillin resistant Staphylococcus (MRSA), Extended spectrum Beta lactamase (ESBL) and Vancomycin resistant enterococci (VRE), resulting in transmission of these to patients. This interventional study was therefore undertaken in three Intensive Care Units (medical, pediatrics and cardiac critical care unit) after training and interactive lectures, workshops and

putting informational posters at relevant places as a part of hand hygiene campaign.

### Aims and objective

- i) To evaluate the effect of hand hygiene campaign in increasing the compliance of hand hygiene in various ICUs.
- ii) To compare the presence of MRSA, ESBL and VRE isolates before and after the campaign.

### Review of literature

Skin, particularly of hands are source of many pathogenic micro-organisms including multi drug resistant bacteria, MRSA, ESBL and VRE transferring them to both the patients and to the health care workers leading to nosocomial infection. Hand hygiene, therefore plays an important role in preventing transmission of these micro-organisms and thus help in decreasing the growing burden of health care associated infections. Numerous works have represented that implementation of training programs can be effective for Nosocomial prevention and control. In 2002, the CDC guidelines recommended use of alcohol based hand rubs for decontamination of hands between each patient contact (of non-soiling type) and the use of liquid soap and water for cleaning visibly contaminated or

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soiled hands. An increase in hand hygiene compliance has been found to be accompanied by a fall in multi-drug resistant organisms rate.

**Material and Methods:-**

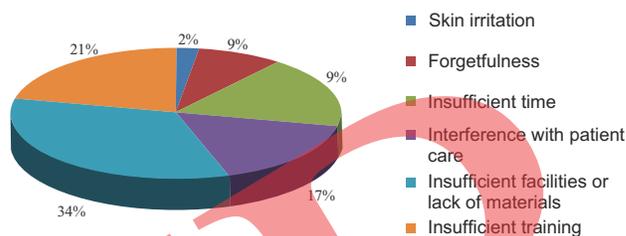
Study duration:-October 2016 to November 2016  
 Study type:-Interventional study Study place:- ICUs of the Departments of Pediatrics, Medicine and Cardiac Critical care Unit of Era’s Lucknow Medical College and Hospital, U.P. India. In this interventional study about 50 ICU staffs (resident doctors, faculty, nurses and HCWs) were included who came in direct contact with the patients and their equipments. Baseline data of hand hygiene practices of all these staffs was obtained by doing a survey. Pre-intervention hand culture were obtained. A hand hygiene team including a microbiologist, infection control nurse and ICU incharge was formed to generate awareness via interactive sessions and training and to observe hand hygiene compliance among ICU staffs. Posters were placed in many places of the ICUs. ABHR was made available between two beds. The staff were also advised to carry their own ABHR in their pockets. Continuous supply of ABHR was ensured. The ICU staffs were observed again after a interval of 1 month for frequency of hand hygiene in the form of hand washing or alcohol based hand rub (ABHR). Post-intervention hand culture was also obtained. Sterile cotton wool swabs, which were pre- moistened in sterile normal saline, were used to swab the interdigital spaces, dorsal and ventral aspect of both hands of the participants. The swabs were inoculated on Blood agar and MacConkey agar media and lawn culture was done and further incubated at 37 0 c for 18 hrs. Each sample was subjected to standard microbiological techniques for isolation and characterization into gram negative and gram positive isolates on the basis of cultural and biochemical characters. Gram positive isolates found to be coagulase positive were subjected to detection of MRSA (methicillin resistant Staphylococcus aureus )by antibiotic sensitivity using cefoxitin discs and all gram negative bacteria were subjected to detection of ESBL (extended spectrum beta-lactamase ) by using ESBL kit(ceftriaxone and ceftriaxone+clavulanic acid) by Kirby bauer disc diffusion method as per CLSI guidelines 2016.

**Results**

On the basis of survey conducted the baseline data collected showed that there were many barriers to hand hygiene. There was no sufficient hand rubs available in the ICUs. There was shortage of staff nurse which led to interference in patient care and thus transmission of infection. Resident doctors had shortage of time which made them ignore hand hygiene practice. Some of the HCWs also reported to

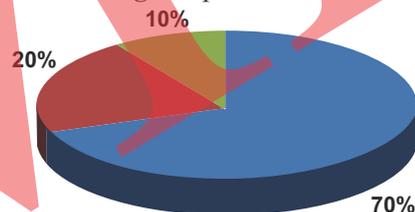
have some sort of irritation in hand by regular washing practice. Forgetfulness was found to be one of the barrier also.

*Barriers to hand hygiene reported via surveys by HVWs in*



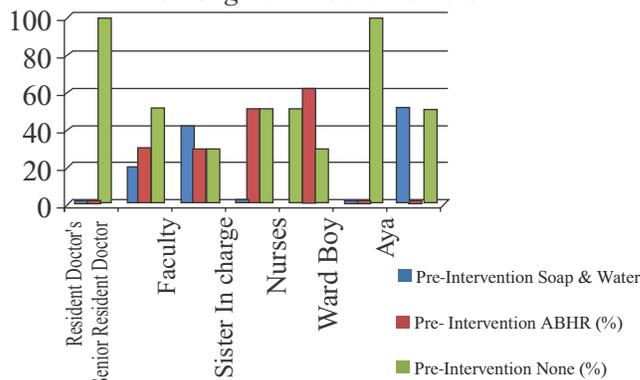
*Ten percent of HCWs were not aware of, which hand hygiene product should be used and only 20% were aware about use and benefits of ABHR, whereas 70% considered soap and water to be the best product.*

*Awareness among HCW's for best hand hygiene product*



*In Pre-intervention assessment, it was found that ward boys and resident doctors were least practicing hand hygiene followed by ayas, nurses and faculty. Use of alcohol based hand rub was around 35% among all the HCWs, highest among the nurses. Hand washing was found to be 28% on an average and highest for the ayas.*

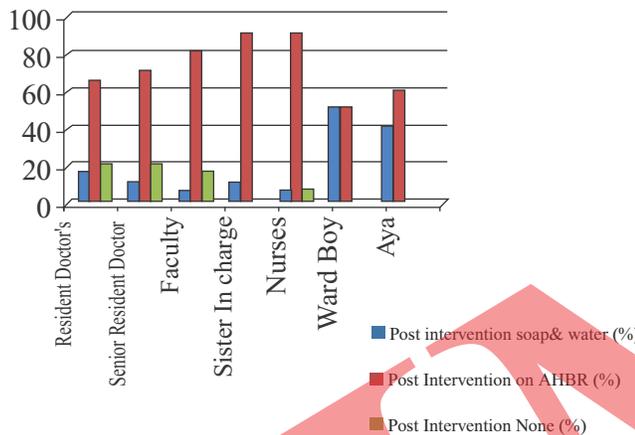
*Pre-Intervention assessment of hand hygiene among health care workers*



*Post-intervention assessment after 30 days of regular training and interactive lecture and surprise visit by*

*the team members led to a significant increase in hand hygiene practice. There was marked increase in the use of ABHR, found to be maximum by sister incharge followed by nurses but the ward boys were among those who did not used the hand rub frequently. Among doctors faculty used ABHR more than the resident doctors and least was being used by ward boys. Use of soap and water markedly decreased among all HCWs of ICUs as most of them preferred ABHR.*

*Post-Intervention assessment of hand hygiene among health care workers*



*Results obtained from Hand culture of HCWs after the campaign showed decrease in isolation of bacteria specially those of MRSA and ESBL. MRSA isolation was low by 35% as that of pre-intervention culture and non of the ESBL were found in post-intervention culture.*

*Throughout the study, post contact hand hygiene was observed significantly more often than pre-contact hand hygiene. In all the ICU, the frequency of hand hygiene was poor (average 31%) but improved significantly after intervention (70%). Doctors were found to be less compliant than nurses. Eighty percent of the surveyed health care workers and doctors in ICU considered the introduction of ABHR to be an effective motivating tool for improving hand hygiene.*

**Conclusion:**-The Hand hygiene campaign showed that the introduction of ABHR, informational poster and regular interactive sessions can improve overall hand hygiene performance in the hospital ICUs. A hand hygiene team must be formed in every hospital and this team must be actively involved in promoting good hand hygiene practices. ABHR must be made available in close vicinity to the patient bed. Hospital administration must ensure continuous supply of ABHR in ICU and other wards. Multi drug resistant bacteria could significant be reduced in hands of HCWs thus reducing the burden of nosocomial infection by transmission to patients.



*Hand Hygiene interactive sessions*



*Hand Hygiene interactive sessions*



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