

## Research Article



## Effectiveness of Alcohol Based Hand Rubbing among Registered Medical Practitioners and Registered Nurses in terms of Bacteriological Profile

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### ABSTRACT

Contaminated hands are the vehicles for the spread of certain viruses and bacteria. It is observed that Health care workers hands become progressively colonized with pathogenic flora. The study was undertaken with the objectives to find the common Microorganisms in finger tips of Registered Medical Practitioners and Registered Nurses of selected rural hospital and to assess the effectiveness of Alcohol based Hand rubbing in terms of Bacteriological Profile. Total 50 Registered Medical Practitioners and Registered Nurses were selected by using convenience sampling technique and observation checklist including laboratory method was used to collect the data. The findings of the study revealed that the majority (74%) of microorganisms present on the finger tips were CoNS followed by Staphylococcus aureus (25.27%) and least common was Gram Negative bacteria (0.73%). Alcohol Based Hand rubbing was effective in this study.

**Keywords:** Alcohol, Staphylococcus aureus, CoNS, Gram Negative bacteria

### INTRODUCTION

Hand washing is emphasized as the single most important measure to prevent cross transmission of micro-organisms and thus to prevent nosocomial infections.<sup>1</sup>

However, under routine hospital practice compliance with this measure is still unacceptably low, less than 50% in most studies published in the past 20 years.<sup>2,3</sup>

This constant finding is worrying because recent studies have shown that this level of compliance will not reduce the risk of transmission of multi resistant bacteria in hospital.<sup>4</sup>

Attempts to improve compliance have included increasing the number of accessible sinks<sup>5</sup> and educating health care workers,<sup>6,7</sup> but none of these interventions led to a marked and sustained improvement in compliance.

To reduce the nosocomial infection prevalence in the Hospital Setting and to improve hand hygiene practices with the help of simple Alcohol Based Hand rubbing or Antiseptic Soap Hand washing, there is a need to evaluate the efficacy of these hand hygiene agents.

### MATERIALS AND METHODS

The present study was conducted in selected rural hospital of Ambala (Haryana), which is a 780 bedded multi-specialty Hospital.

The target population for the study was Registered Medical Practitioners and Registered Nurses in Medical, Surgical, Orthopedic, Pediatric, Obstetric and Gynecological units including ICUs. Using convenience sampling technique, the samples of 50 Registered Medical Practitioners and Registered Nurses were selected.

The tool observational checklist was prepared to assess for Microbiological Sample Collection with Finger Imprint Technique.

The tool was developed through relevant literature and consultation with experts.

Formal administrative approval was obtained from the Principal and from Medical Superintendent, of selected rural Hospital of Ambala. Informed written consent was taken from the Study samples.

The fingertip imprint from the participant's dominant hand was taken before Alcohol Based Hand rubbing. The procedure (Alcohol Based Hand rubbing) was demonstrated to respective groups.

The Registered Medical Practitioners and Registered Nurses performed the procedure (Alcohol Based Hand rubbing) and give the finger impression onto Blood agar plate without tearing the agar surface.

The Blood Agar plates were transferred to the Microbiology Laboratory and incubated at 37° C for 24 hours. After incubation, colonies were counted with colony counter and bacterial identification was done by Gram staining and battery of biochemical reactions. The data was analyzed using descriptive and inferential statistics.

### RESULTS

Out of total 50 study sample 33 sample were Registered Nurses and 17 were Registered Medical Practitioners.

Table 1 depicts that the majority (74%) of Microorganisms present on the fingertips of Registered Medical Practitioners and Registered Nurses were CoNS (Coagulase Negative Staphylococci) and the 2<sup>nd</sup> most common organisms were Staphylococcus aureus (25.27%)



and the least common organism found was gram negative bacteria (0.73%).

**Table 1:** Mean of the Bacteriological Profile of Registered Medical Practitioners and Registered Nurses before Alcohol Based Hand rubbing.

N=50

S. No.	Bacteriological Profile	Percentage (%)
1	CoNS (Coagulase Negative Staphylococci)	74.00
2	Staphylococcus aureus	25.27
3	Gram negative bacteria	0.73

Table 2 indicates that the Mean Bacteriological Count of CoNS before Alcohol Based Hand rubbing was 15.00 and after Alcohol Based Hand rubbing was 0.64 with a Mean Difference of 14.36.

The computed t -value (8.01) was found to be statistically significant at 0.05 level.

The result further show that the Mean Bacteriological Count of Staphylococcus aureus before Alcohol Based Hand rubbing was 2.60 and after Alcohol Based Hand rubbing was 0.16 with a Mean Difference of 2.44.

The computed t-value (4.70) was found to be statistically significant at 0.05 level.

**Table 2:** Mean, Mean Difference, Standard Deviation Difference, Standard error of Mean Difference and t -value Bacteriological Profile of Registered Medical Practitioners and Registered Nurses of Alcohol Based Hand rubbing.

N=50

Alcohol Based Hand rubbing	Mean	M <sub>D</sub>	S.D <sub>D</sub>	SE <sub>MD</sub>	't'
<b>CoNS</b>					
Colony Count(CFU/cm <sup>2</sup> )					
Before Hand rubbing	15.00	14.36	12.02	1.7	8.01 <sup>*</sup>
After Hand rubbing	0.64				
<b>Staphylococcus aureus</b>					
Before Hand rubbing	2.60	2.44	3.67	0.52	4.70 <sup>*</sup>
After Hand rubbing	0.16				
<b>Gram Negative Bacteria</b>					
Before Hand rubbing	0.08	0.06	0.42	0.06	1.00 <sup>NS</sup>
After Hand rubbing	0.02				

It is also show in the Table that the Mean Bacteriological Count of gram, negative bacteria before Alcohol Based Hand rubbing was 0.08 and after Alcohol Based Hand rubbing was 0.02 with a Mean Difference of 0.06.

The computed t -value (1.00) was not found to be statistically significant at 0.05 level.

Alcohol based Hand rubbing significantly reduces the Bacteriological Count of CoNS and Staphylococcus aureus but there was no significant difference in the Bacteriological Count of gram negative bacteria after Alcohol Based Hand rubbing.

Table 3 indicates that the mean Bacteriological Count in Registered Medical Practitioners before Alcohol Based Hand rubbing was 18.06 and the mean Bacteriological Count after Alcohol Based Hand rubbing was 0.88 with a Mean Difference of 17.18. The computed t -value (5.17) was found to be statistically significant at 0.05 level of significance.

**Table 3:** Mean, Mean Difference, Standard Deviation Difference, Standard error of Mean Difference and t -value of Bacteriological Count of Registered Medical Practitioners and Registered Nurses before and after in Alcohol Based Hand rubbing.

N=50

Registered Medical Practitioners and Registered Nurses	Mean	M <sub>D</sub>	S.D <sub>D</sub>	SE <sub>MD</sub>	't'	Df
<b>Alcohol Based Hand rubbing</b>						
Colony Count (CFU/cm <sup>2</sup> )						
Before Hand rubbing	18.06	17.18	13.29	3.32	5.17 <sup>*</sup>	15
After Hand rubbing	0.88					

## DISCUSSION

The present study was undertaken to identify the common microorganisms in finger tips of Registered Medical Practitioners and Registered Nurses of selected rural hospital, Ambala and to assess the effectiveness of Alcohol Based Hand rubbing in terms of Bacteriological Profile. According to first objective, the investigator found the microorganisms in finger tips of Registered Medical Practitioners and Registered Nurses of selected rural hospital, Ambala which showed that the majority (74%) of Micro-organisms present on the fingertips were CoNS (Coagulase Negative Staphylococci) followed by staphylococcus aureus (25.27%) and the least common organism found was gram negative bacteria (0.73%). Similarly a study conducted by Mody L assessed the Introduction of a waterless alcohol-based hand rub in a long-term-care facility in University of Michigan Medical School. HCWs were colonized frequently with GNB (66%), Candida (41%), S. aureus (20%), and VRE (9%). Although colonization did not change from baseline on either ward, the rub was more effective in clearing GNB (P =.03) and S. aureus (P = .003).<sup>8</sup> Similarly Didier Pittet found the predominant flora was normal skin flora consist of Coagulase-Negative Staphylococci, Corynebacterium species, and Micrococcus species. There were also isolates of Staphylococcus aureus (n=39, 10.5%) and gram-negative bacilli (n=54, 14.5%). Simple hand washing before patient care, without hand antiseptics, was also associated with higher colony counts (52 CFUs; P=.03).<sup>9</sup>

## CONCLUSION

This study indicates that use of an alcohol based hand rubbing can decrease the Microorganisms effectively and provide a tool for an effective control program.



**REFERENCES**

1. Conly JM, Hill S, Ross J, Lertzman J, Louie TJ, Handwashing practices in an intensive care unit: the effects of an educational program and its relationship to infection rates, *Am J Infect Control*, 17, 1989, 330–339.
2. Pittet D, Mourouga P, Perneger TV, Compliance with hand washing in a teaching hospital, *Ann Intern Med*, 130, 1999, 126–130.
3. Rotter ML, Hand washing, hand disinfection and skin disinfection, *Hospital epidemiology and infection control*. 2nd ed. Baltimore: Williams and Wilkins, 1999, 691–709
4. Austin DJ, Bonten MJM, Weinstein RA, Slaughter S, Anderson RM, Vancomycin-resistant enterococci in intensive-care hospital settings: transmission dynamics, persistence, and the impact of infection control programs, *Proc Natl Acad Sci U S A*, 96, 1999, 6908–6913.
5. Preston GA, Larson EL, Stamm WE, The effect of private isolation rooms on patient care practices, colonization and infection in an intensive care unit, *Am J Med*, 70, 1981, 641–645.
6. Simmons B, Bryant J, Neiman K, Spencer L, Arheart K, The role of handwashing in prevention of endemic intensive care unit infections, *Infect Control Hosp Epidemiol*, 11, 1990, 589–594.
7. Bischoff WE, Reynolds TM, Sessler CN, Edmond MB, Wenzel RP, Handwashing compliance by health care workers: the impact of introducing an accessible, alcohol-based hand antiseptic, *Arch Intern Med*, 160, 2000, 1017–1021.
8. Mody L, Introduction of a waterless alcohol-based hand rub in a long-term-care facility, *Infect Control Hosp Epidemiol*, 24, 2003, 165-171.
9. Pittet D, Bacterial Contamination of the Hands of Hospital Staff During Routine Patient Care, *Arch Intern Med*, 159, 1999, 821-826.

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