



EFFECTIVENESS OF STANDARD HAND HYGIENE PROCEDURE VERSUS HAND RUB AGAINST TRANSIENT BACTERIAL FLORA ON HANDS: LITERATURE REVIEW

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ABSTRACT

Researcher attempts to evaluate efficiency of two distinctive hand cleanliness measures on microbiota level on hands of medical personnels. Disinfecting hands is simple and cost effective method for prevention of nosocomial infections. Cleaning the hand using soaps and ethanol based sanitizer both helps in eliminating majority of life threatening bacteria. In this study, efficacy of both the hand hygiene methods is compared in order to find out which microbes are killed and which are not destroyed from hand hygiene measures. It was concluded with this review of literature that certain microbes like *C. difficile* are eliminated only by washing hands using water and soap, whereas in some cases alcoholic hand rub is much more effective method.

KEYWORDS : hand hygiene, soap and water, Alcohol sanitizer or rub, transient bacterial flora.

INTRODUCTION:

Hand sanitation is the key measure suggested to counteract and control the spread of pathogens within the hospital setup to safeguard the patients and health professionals from procuring any disease and reducing the chances of getting infected in hospital as well as in community. Sanitizing with ethanol rubs is considered as the golden approach to execute sanitation of hands unless there is a need for using water and soap.¹ The duration for rubbing procedure is estimated to be around twenty to thirty seconds whereas for washing hands using soap - water is forty to sixty seconds as per World Health Organization guidelines.² Human skin is generally inhabited with various pathogens at different body parts. They were broadly classified into two, resident and transient flora. Resident flora are present under the skin whereas transient flora are seen to get collected over the superficial layers of the skin. Transmission of these organisms is either by direct contact with patients or dirty surfaces. These transient pathogens are responsible for majority nosocomial infections in hospitals which leads to fatal problems.² Amongst them, MRSA, Vancomycin-resistant Enterococcus, *C. difficile*, norovirus etc. are most prevailing.³

With respect to these evidences WHO developed 5 moments of hand hygiene. It includes - **Cleaning hands prior - contacting the patients, aseptic procedures & after- exposure to body fluids, patients contact and contacting patients surrounding environment.**³

The reviewed literature was collected through various database includes CINAL, MEDLINE (Medical Literature Analysis & Retrieval System Online), Pub Med, Science Direct, Springer Link, Pro Quest & Google scholar.

Material Methods & Findings: The study is mainly headed on to rule out the effect of traditional hand disinfecting method and alcoholic rubs in decreasing the transitory microflora from medical personnels hands. Researcher found several reviews. Some of the significant reviews are divided as follows:

I. Related to Soap and water

1. Maxine Burton et.al (2011) conducted an experimental study on the Effect of Handwashing with Water or Soap on Bacterial Contamination of Hands, British museum. Research was done on twenty volunteers where in hand washing with soap and water, only water and no intervention was compared for their effectiveness in reducing the pathogens. The selected population were made to come in contact with the door handles, railings, etc. randomly and the culture samples were taken for the test. In total 480 samples were collected and was evaluated. Findings revealed

that Enterococcus and Enterobacter microbes were decreased after cleaning with liquid soap.⁴

II. Related to Hand Rub

1. D Pires t.al. (2019) carried out a randomized control trial on Antibacterial Efficacy of Handrubbing for 15 Versus 30 Seconds: EN 1500-based Randomized Experimental Study with Different Loads of Staphylococcus Aureus and Escherichia Coli. In this, study the hands of 18 medical professionals were soiled with E.coli and Staph. Aureus. Finger impressions via culture swabs were taken after sanitizing with ABHR for 15 seconds and 30 seconds respectively. The end result showed that cRF for S. aureus was greater than Escherichia coli with no relation to amount of time, hence it was proved that fifteen seconds is not less than 30 seconds of hand rubbing.⁵
2. Abhishek Deshpande et.al (2018) had done a randomized cross over trial on Comparative Antimicrobial Efficacy of Two Hand Sanitizers in Intensive Care Units Common Areas. For this project the 51 subjects from three ICUs were randomly allocated to 2 different group of interventions - ethyl alcohol only and ethanol + CHG. Hand sanitizing done after every patient care and culture swabs were taken from hands and the number of CFU was compared to rule out which is better. Findings revealed that CHG+ Alcohol is better in decreasing aerobic Colony forming units among medical experts arms.⁶
3. Kapil R et.al (2015) conducted an educational intervention on Hand Hygiene in Reducing Transient Flora on the Hands of Healthcare Workers. In this project, sixty samples were taught about steps of hand rub use and after that culture swabs were obtained from both the hands and the knowledge regarding hand hygiene was assessed using questionnaire. It was concluded that more than 100 colonies were found on the hands of health care personnel's.⁷

III. Comparison of Hand wash with Soap and Water and Hand Rub

1. Tetty Aman et.al (2019) undertook an analytical study on Effectiveness Hand Washing and Hand Rub Method in Reducing Total Bacteria Colony from Nurses in Medan. The goal of the research is to assess the efficacy of two hand disinfecting techniques to decrease bacteria from nurses hands. Almost sixteen staffs distributed in two teams were included in the project and culture swab were collected prior and after cleaning their arms and were clinically tested. Use of hand sanitizer in place of soap and water is suggested by World Health Organization.⁸
2. Tuladhar E et.al. (2015) carried out a comparative study on Reducing Viral Contamination From Finger Pads: Handwashing

- Is More Effective Than Alcohol-Based Hand Disinfectants. The goal was to check effectiveness of alcohol hand rub against human intestinal and respiratory infections and to analyse adequacy of hand rub and hand wash against these noroviruses. This research was used to analyse viability of ethanol rub and soap water against persons enteric and pulmonary viruses. Hence concluded that disinfecting hands using soaps ($>3.0 \pm 0.4 \log_{10}$) are better compared to handrubs ($2.8 \pm 1.5 \log_{10}$).⁹
3. Ujjwala N. Gaikwad et.al. (2013) had done a descriptive cross sectional study on Antimicrobial efficacy of traditional hand washing & alcohol based hand washing in nursing staff of a tertiary care rural hospital. It was conducted among 100 staff nurses working in various ICU's and wards. Using random sampling technique samples they were divided into two groups, 50 samples in each group. One group had experienced traditional hand washing method and other performed alcoholic hand rub method. Culture swabs were collected before and after hand washing with both methods simultaneously. Colonies were isolated using blood agar and MacConkey's medium. Findings revealed that Alcohol based hand rub is superior to traditional method of hand washing in decreasing transitory microflora from arms of staff.¹⁰
 4. VS Sharma, S Dutta et.al (2013) conducted a randomized controlled trial on Comparing Hand Hygiene Measures in a Neonatal ICU. To assess hand hygiene practices like hand disinfection using soap- water and ethanol sanitizer and iodophors in NICU. In this project, the 35 participants were allocated with hand rub of betadine and plain soap and water through randomization. They had fourteen days of neutral time. And culture swabs were taken after care of five patients and were evaluated on sterile media plate for colony formation. It was concluded that iodophors are better in comparison to non-medicated bar soap for palm disinfection.¹¹
 5. Oughton MT et.al (2009) conducted a randomized cross over study on Hand Hygiene With Soap and Water Is Superior to Alcohol Rub and Antiseptic Wipes for Removal of Clostridium Difficile. In which different interventions like the use of plain soap with lukewarm water and cold water, antiseptic soap with lukewarm water, antibacterial wipes, alcoholic hand sanitizers are examined on 10 volunteers according to the decrease in CFU .The samples are collected on the basis of two methods whole hand and palmar surface. It was concluded that the adequacy of soap and water is higher than that of alcoholic sanitizers in reduction of C. difficile.¹²
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DISCUSSION:

After reviewing various literatures it is seen that both the intervention had their own uniqueness in removing the bacteria from the hands whereas some studies did show either one of them that is ABHR and antibacterial soaps to be superior. But it is also observed in some studies that neither of them kills all kind of bacteria or floras from the hands. Some floras are reduced only with the use of alcoholic hand rub whereas some bacteria are killed only from antimicrobial soaps.

CONCLUSION:

Researchers assessed that both sanitation methodology are beneficial in removing pathogens from hands but still some pathogens prevail after it. Though hand sanitizer is productive and very brief procedure for palm disinfection but some of the bacteria like C. difficile can still remain in the hands and can be killed only after hand washing with soap and water.

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