Antimicrobial vs. Non-Antimicrobial Soaps for Inpatient Hospital Staff Hand Hygiene

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ASK THE QUESTION

Question 1: Is a plain non-antimicrobial soap an effective alternative to an antimicrobial soap (e.g. a CHG-based product) for inpatient hospital staff hand hygiene?

SEARCH FOR EVIDENCE

Search strategies included research-based articles published in English

Databases included PubMed, Scopus, CINAHL, also looked at references and citing articles

Key words/terms (“Hand Hygiene”[Mesh] OR “hand hygiene” OR “hand disinfection” OR “hand washing” OR handwash OR “Infection/prevention and control”[Mesh]) AND (Anti-Infective Agents[MeSH] OR antimicrobial OR Chlorhexidine[MeSH] OR chlorhexidine gluconate) AND (non-antimicrobial OR nonantimicrobial OR non-antiseptic)

CRITICALLY ANALYZE THE EVIDENCE

Question 1: Is a plain non-antimicrobial soap an effective alternative to an antimicrobial soap (e.g. a CHG-based product) for inpatient hospital staff hand hygiene?

Practice Recommendation/Conclusion: Antimicrobial soap is more effective than non-antimicrobial soap, and is preferred over non-antimicrobial soap for decontaminating hands in clinical situations. Strong Recommendation, Moderate Quality Evidence.
One systematic review and one RCT were found specifically addressing the effectiveness of antimicrobial, compared to non-antimicrobial soaps. A systematic review and meta-analysis (Montville and Schaffner 2011) of 25 publications, containing 374 observations with data on hand washing efficacy found a difference in the effectiveness of antimicrobial and non-antimicrobial soaps. The difference was repeatedly observed through a variety of analyses. **The review showed that antimicrobial soap was consistently and statistically significantly always more effective than non-antimicrobial soap.** However, the magnitude of the difference was small (~0.5 log CFU), especially when the experimental design used only the resident (naturally occurring) microflora to measure the effect. The authors concluded that although differences in efficacy between antimicrobial and non-antimicrobial soap may be relatively small, they do exist, and small but significant differences in pathogen levels on hands can have a significant effect on public health. The studies included in the review were small, including only a limited number of observations.

An RCT (Winnefeld et al. 2000) assessing skin tolerance and antimicrobial effects of two widely accepted hand hygiene measures (an alcohol-based disinfectant or a hand wash with a non-antiseptic soap) found that **in everyday hospital practice, alcohol-based disinfectant was more effective and better tolerated than non-antiseptic soap.** The study showed that soap was at risk of spreading contamination; and skin comfort strongly influenced the number and the quality of hand hygiene procedures. However, the RCT was small, involving only 52 inpatient hospital nurses.

Although not directly addressing the clinical question, a randomized equivalency study (Parienti et al. 2002) comparing the effectiveness of hand-cleansing protocols in preventing surgical site infections during routine surgical practice, found that hand-rubbing with aqueous alcoholic solution, preceded by a 1-minute non-antiseptic hand wash before each surgeon's first procedure of the day and before any other procedure if the hands were soiled, was as effective as traditional hand-scrubbing with antiseptic soap in preventing surgical site infections. The hand-rubbing protocol was better tolerated by the surgical teams and improved compliance with hygiene guidelines. The study included 4387 consecutive patients who underwent surgery at a hospital in France.

The 2002 Guideline for Hand Hygiene in Health-Care Settings Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force states that alcohol-based hand rubs are the most efficacious agents for reducing the number of bacteria on the hands of hospital personnel. Antiseptic soaps and detergents are the next most effective, and non-antimicrobial soaps are the least effective. The Task Force recommends soap and water for visibly soil hands, and alcohol-based hand rubs for routine decontamination of hands for all clinical indications.

The 2004 update of the guideline recommends the following:
1) When hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids, wash hands with either a non-antimicrobial soap and water or an antimicrobial soap and water.

2) If hands are not visibly soiled, use an alcohol-based hand rub for routinely decontaminating hands in all other clinical situations.

3) Alternatively, wash hands with an antimicrobial soap and water in all clinical situations.

4) Antimicrobial-impregnated wipes (i.e., towelettes) may be considered as an alternative to washing hands with non-antimicrobial soap and water. Because they are not as effective as alcohol-based hand rubs or washing hands with an antimicrobial soap and water for reducing bacterial counts on the hands of healthcare workers they are not a substitute for using an alcohol-based hand rub or antimicrobial soap.

The 2009 World Health Organization Guideline on Hand Hygiene in Healthcare recommends:

1) Wash hands with soap and water when visibly dirty or visibly soiled with blood or other body fluids or after using the toilet.

2) If exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of Clostridium difficile, hand washing with soap and water is the preferred means.

3) Use an alcohol-based hand rub as the preferred means for routine hand antisepsis in all other clinical situations.

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### PICO Question: Is a plain non-antimicrobial soap an effective alternative to an antimicrobial soap (e.g. a CHG-based product) for inpatient hospital staff hand hygiene?

<table>
<thead>
<tr>
<th>Author/Date/Journal</th>
<th>Purpose of Study</th>
<th>Study Design</th>
<th>Sample &amp; Setting</th>
<th>Outcomes</th>
<th>Design Limitations</th>
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<tbody>
<tr>
<td>Montville &amp; Schaffner, 2011, Journal of Food Protection</td>
<td>Determine if there is a difference between antimicrobial and non-antimicrobial soaps and to identify the methodological factors that might affect this</td>
<td>Systematic Review and Meta-Analysis</td>
<td>25 publications, containing 374 observations with data on hand washing efficacy and experimental conditions (sample size, wash duration, soap quantity, challenge organism)</td>
<td>The majority of the studies included fewer than 15 observations with each treatment and included a direct comparison between non-antimicrobial soap and antimicrobial soap. Although differences in efficacy between antimicrobial and nonantimicrobial soap were</td>
<td>Study Limitations = None</td>
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<td>Systematic Review</td>
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<td>Review did not address focused clinical question</td>
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<td>Search was not detailed or exhaustive</td>
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<td>Quality of the studies was not appraised or studies were of low quality</td>
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<td>Methods and/or results were inconsistent across</td>
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| difference in inoculum size, and neutralization method) | small (~0.5-log CFU reduction difference), antimicrobial soap produced consistently statistically significantly greater reductions. This difference was true for any of the antimicrobial compounds investigated where n was >20 (chlorhexidine gluconate, iodophor, triclosan, or povidone). Average log reductions were statistically significantly greater (~2 log CFU) when either gram-positive or gram negative transient organisms were deliberately added to hands compared with experiments done with resident hand flora (~0.5 log CFU). |

Parienti et al., 2002, JAMA
To compare the effectiveness of hand-cleansing protocols in preventing surgical site infections during routine surgical practice

INTERVENTIONS: Surgical services used 2 hand-cleansing methods alternately every other month: a hand-rubbing protocol with 75% aqueous alcoholic solution containing propanol-1, propanol-2, and meclothionil

Six surgical services from teaching and nonteaching hospitals in France. PATIENTS: A total of 4387 consecutive patients who underwent clean and clean-contaminated surgeries

The 2 protocols were comparable in regard to surgical site infection risk factors. Surgical site infection rates were 55 of 2252 (2.44%) in the hand-rubbing protocol and 53 of 2135 (2.48%) in the hand-scrubbing protocol, for a difference of 0.04% (95% confidence interval, -0.88% to 0.96%). Based on subsets of personnel, compliance with the recommended duration of hand antisepsis was better in the hand-rubbing protocol of the study compared with the hand-

Study Limitations = None

RCT & Quasi-Experimental Studies

- Insufficient sample size
- Lack of randomization
- Lack of blinding
- Stopped early for benefit
- Lack of allocation concealment
- Selective reporting of measures
- Large losses to F/U

Increase Quality Rating if:
- Large Effect

Level of evidence for studies as a whole:
- High
- Moderate
- Low
- Very Low

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| Winnefeld et al., 2000, *British Journal of Dermatology* | To assess skin tolerance and antimicrobial effects of two widely accepted hand hygiene measures under in-use conditions | RCT | Nurses randomly assigned for an 8-day period to either an alcohol-based disinfectant or a hand wash with a non-antiseptic soap. At baseline and at the end of the test period, microbiological hand samples were obtained both before and after a hand hygiene procedure | Fifty-two nurses in hospital setting | Self-assessment of skin condition and grade of skin damage worsened significantly more in the group using soap than in the group using alcoholic disinfectant ($P=0.004$) and $P=0.01$, respectively. The alcohol-based rinse was significantly more effective than liquid soap in removing transient contaminant micro-organisms ($P=0.016$). Twenty of 50 hand washes with non-antiseptic soap apparently resulted in bacterial contamination of the hands. At the end of the study, the total bacterial count increased with the increasing number of hand washes in the soap group ($P=0.003$), and with the degree of skin damage ($P=0.005$) in the antiseptic group. | Study Limitations = |

- None
- RCT & Quasi-Experimental Studies
- Insufficient sample size
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| etilsulfate followed by nonantiseptic soap; and a hand-scrubbing protocol with antiseptic preparation containing 4% povidone iodine or 4% chlorhexidine gluconate | scrubbing protocol (44% vs 28%, respectively; $P=0.008$), as was tolerance, with less skin dryness and less skin irritation after aqueous solution use | | | | |
REFERENCES


