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Major article

Hesitation and error: Does product placement in an emergency department influence hand hygiene performance?

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Background: Existing research has consistently demonstrated poor compliance by health care workers with hand hygiene standards. This study examined the extent to which incorrect hand hygiene occurred as a result of the inability to easily distinguish between different hand hygiene solutions placed at washbasins.

Methods: A direct observational method was used using ceiling-mounted, motion-activated video camera surveillance in a tertiary referral emergency department in Australia. Data from a 24-hour period on day 10 of the recordings were collected into the Hand Hygiene–Technique Observation Tool based on Feldman's criteria as modified by Larson and Lusk.

Results: A total of 459 episodes of hand hygiene were recorded by 6 video cameras in the 24-hour period. The observed overall rate of error in this study was 6.2% (27 episodes). In addition an overall rate of hesitation was 5.8% (26 episodes). There was no statistically significant difference in error rates with the 2 hand washbasin configurations.

Conclusion: The amelioration of causes of error and hesitation by standardization of the appearance and relative positioning of hand hygiene solutions at washbasins may translate in to improved hand hygiene behaviors. Placement of moisturizer at the washbasin may not be essential.

Hand hygiene is well established as the fundamental principle and practice underscoring the prevention and control of health care–associated infection.[1,2] Despite this, data from Hand Hygiene Australia from April 1, 2014-June 30, 2014, report a mean hand hygiene compliance rate of emergency units in participating public and private hospitals as 73.9% (95% confidence interval [CI], 73.3%-74.4%). In comparison, mean compliance in medical and surgical units was 80.5% (95% CI, 80.2%-80.8%) and 80.2% (95% CI, 80%-80.5%), respectively.[3] Poorer compliance in emergency departments (EDs) has been attributed to a variety of factors, including time constraints, acuity of patient illness and injury, perceived urgency of the clinical situation, health worker skill mix, overcrowding, and large numbers of patient contacts.[4-7]

Improvement of health care workers' hand hygiene practices is therefore a challenge, and multiple studies have indicated that hand hygiene compliance can only be improved and sustained through the use of an approach that takes into account the multifaceted nature of behavior change.[8-10] Efforts to improve hand hygiene compliance include continuous education and motivation programs[9-12] and measurement and feedback of hand hygiene compliance rate to users.[2,9,10,12]

One important factor known to influence hand hygiene performance is the availability, utility, and accessibility of hand hygiene products.[2] Evidence and best practice indicates that in some instances of hand hygiene practice, the location and accessibility of hand hygiene products directly influence hand hygiene behavior.[9-13] This is most notable with the accessibility of alcohol-based hand hygiene products. Put simply, the closer the alcohol-based handrub to the point of indication of use, such

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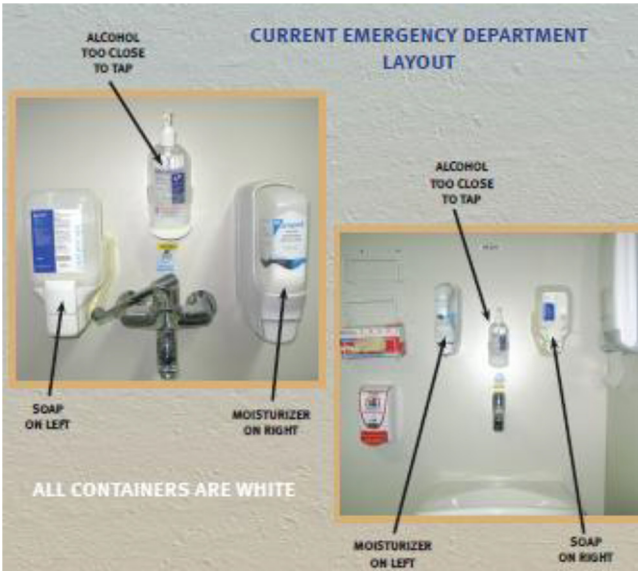

Fig 1. Examples of the 2 types of washbasins, as viewed by the clinician.

Fig 2. Hand hygiene basin configuration as viewed by video camera 2 (viewed right to left by clinician facing basin). The green 2 sign refers to the actual washbasin number in the study. *1*, paper towel dispenser; *2*, soap dispenser; *3*, hand washbasin; *4*, sensor tap; *5*, hand moisturizer dispenser; *6*, alcohol-based hand foam dispenser; *7*, glove holder; *8*, waste receptacle (clinical).

as the end of the patient bed or on the wall in each clinical care area, directly influences practice. Furthermore, research has shown that it saves time, and preliminary data reported by Widmer and colleagues[14,15] demonstrate better compliance than handwashing.

One of the authors (M.S.) perceived a problem with the inability to identify and readily distinguish the different hand hygiene solutions located at hand washbasins in the ED. This resulted in his intermittent use of moisturizing lotion instead of soap solution. This study sought to determine how frequent this problem was as measured by hesitation during product selection and use of an incorrect solution for handwashing.

METHODS

Study design

A nonexperimental, descriptive observational study was used to examine the hand hygiene practices of the ED's health personnel. The university and hospital human research ethics committees approved this study. There were no variations to the approved study protocol and no complaints received.

Study procedures

Study setting and population

This study was conducted at a 760-bed metropolitan, adult, tertiary-referral hospital and level 1 trauma center in Australia. The ED saw nearly 50,000 presentations annually, with an admission rate of 35%. In the acute and observation areas of the ED there were 21 hand washbasins of which 16 (defined as type L) had the soap solution situated on the left of the basin and moisturizing lotion on the right side of the basin. The remaining 5 basins (defined as type R) had the reverse configuration with the moisturizer on the left and the soap solution on the right (Fig 1). Alcohol-based hand hygiene product was available randomly throughout the unit in wall-mounted or stand-alone dispensers.

Study participants

The participants in this study were staff of the ED. Written consent for participation was not sought because of the nature of the study and technology. Staff were aware the cameras were installed for observing hand hygiene practices, but they were not aware of the specific variables being measured. It was also impossible for staff to discern whether the cameras were filming once activated during use of the hand washbasins. Participant information sheets were e-mailed to all ED staff, posted on staff noticeboards, and circulated to all staff during meetings, 2 weeks prior to the commencement of the study, to enable participant consent. Staff were advised that only 6 hand washbasins had cameras and they could use another basin if they did not want to participate in the study. Although specific features, such as type of uniform or presence of hospital identification tag, were used to categorize the craft group from video footage, no person-identifiable information was recorded, and no staff were generally identified or otherwise. To protect patient privacy, the cameras only had views of the hand washbasins and dispensers, and they were positioned so that the cameras captured no facial features. With regard to staff privacy, the collected data did not include any subject identifying information, and the video segments were not used to observe individual participants.

All ED staff (clinical and nonclinical) and visiting non-ED personnel (eg, ambulance officers) working during the observation period in the ED were included in the study. Patients, visitors, and individuals who could not be clearly identified as staff were excluded from the analyses.

Data collection

Six ceiling-mounted, motion-activated, electronic video cameras were installed above 3 type L and 3 type R washbasins on November 12, 2010 (Fig 2). Hand hygiene practices were recorded over the next 18 days. Day 10 was selected for this study to minimize the Hawthorne effect associated with the participants' knowledge of camera installation. Data from a 24-hour period on day 10 of the recordings were collected into the Hand Hygiene–Technique Observation Tool (developed by authors J.S. and R.Z.S.), based on Feldman's criteria as modified by Larson and Lusk.[16] This tool consisted of 24 variables, but only 3 were used in this analysis: (1) what product did the individual use to clean their hands?; (2) does the individual use an incorrect product for handwashing?; and (3) does the individual display hesitation during the selection