



Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major articles

The use of passive visual stimuli to enhance compliance with handwashing in a perioperative setting

Tammy A. Beyfus RN ^a, Nancy L. Dawson MD ^b, Cynthia H. Danner MSN, RN, NE-BC ^a,
Bhupendra Rawal MS ^c, Paul E. Gruber ^d, Steven P. Petrou MD ^{e,*}

^a Nursing Administration, Mayo Clinic Florida, Jacksonville, FL

^b Department of Hospital Internal Medicine, Mayo Clinic Florida, Jacksonville, FL

^c Department of Health Sciences Research, Division of Biomedical Statistics and Informatics, Mayo Clinic Florida, Jacksonville, FL

^d Administrative Operations, Mayo Clinic Florida, Jacksonville, FL

^e Department of Urology, Mayo Clinic Florida, Jacksonville, FL

Key Words:
Alcohol foam dispenser

Background: To encourage handwashing, we analyzed the effect that a passive visual stimulus in the form of a picture of a set of eyes had on self-directed hand hygiene among health care staff.

Methods: This was a prospective, single-blind study using a repeated measure design. Four dispensers of alcohol foam located in positions identified as #1, #2, #3, and #4 were used to deliver a single uniform volume of alcohol foam in an automated fashion. Pictures of eyes were placed on dispensers #1 and #3 but not dispensers #2 and #4 for 1 time period. The visual stimulus was rotated with each study time period. At the end of each study period, the volumes dispensed were examined to determine if the visual stimulus had a statistically significant influence on the volume dispensed.

Results: There were a total of 6 time periods. The average volume dispensed in stations with eyes was 279 cc versus that in the stations without eyes, which was 246 cc, and this was a statistically significant difference ($P = .009$).

Conclusion: The correct visual stimuli may enhance compliance with hand hygiene in health care settings.

© 2015 Association for Professionals in Infection Control and Epidemiology, Inc. Published by Elsevier Inc. All rights reserved.

It is estimated that 1 in 25 hospital patients acquires a health care-associated infection, and about 75,000 patients died from health care-associated infection during 2011 in the United States.¹ Pioneered by Semmelweis, handwashing has been identified as an important tool to decrease the rate of hospital-based infections.² In 1975, the Centers for Disease Control and Prevention began to publish formal guidelines for handwashing for health care professionals to reduce transmission of infection,³ initially recommending soap and water. Since that time, multiple studies have shown the efficacy of alcohol handrubs (AHRs), and current data support the use of AHRs as a method of hand hygiene to reduce infection transmission⁴; guidelines recommend AHRs for routine decontamination of hands when hands are not visibly soiled.⁵

However, compliance with hand hygiene has been identified as problematic,^{6,7} and overall compliance rates with hand hygiene guide-

lines in hospitals are estimated to be only about 40%.⁸ In addition, the best method(s) to enhance hand hygiene compliance has yet to be identified.⁹ Rigorous systematic reviews have not shown adequate data for a single intervention, citing the need for continued research.¹⁰ Many studies have focused on behavior determinants, and there is some evidence that this focus produces positive results.¹¹ Past psychological research has noted that passive visual stimuli may have an influence on behavior.¹² We aimed to gauge the effect of a passive visual stimulus in the form of a picture of a set of eyes on self-directed hand hygiene by health care staff.

MATERIALS AND METHODS

This was a prospective, single-blind study conducted in the perioperative holding area using a repeated measure design. The study received institutional review board approval. The selected perianesthesia area was part of a 320-bed academic hospital and served 15 operating rooms with an average of 35 cases per day. A total of 54 wall-mounted dispensers existed in the area and 4 automatic dispensing models were added for use in the study, for a total of 58 dispensers. The chosen locations were high-traffic unit

* Address correspondence to Steven P. Petrou, MD, Department of Urology, Mayo Clinic, 4500 San Pablo Rd, Jacksonville, FL 32224.

E-mail address: petrou.steven@mayo.edu (S.P. Petrou).

Financial Support: No funding support was obtained for this study.

Conflicts of Interest: None to report.

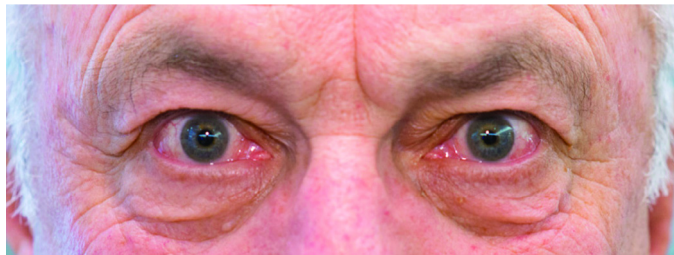


Fig 1. The image that was used as the passive visual stimulus.

corridor intersections to maximize and optimize uniformity of employee exposure. The 4 automatic alcohol foam dispensers for AHR deliver a single uniform volume of alcohol foam automatically when hands are placed under the dispenser. They were located at 4 static strategic locations in the unit, with the locations identified as #1, #2, #3, and #4 by the study staff. The location of the dispensers did not change over the course of the study. A picture of the eyes of an unnamed but recognizable thought leader at the institution was placed above dispensers #1 and #3 but not on dispensers #2 and #4 for 1 time period (Fig 1).

At the end of the time period, the amount of alcohol solution volume dispensed by each of the 4 dispensers was quantified. The amount of alcohol solution dispensed by the nonstudy dispensers were not tabulated. The eyes pictures were then removed from #1 and #3 and placed on dispensers #2 and #4 for the next time period, and the dispensed volume of each of the 4 dispensers was quantified. The process was repeated for 4 additional time periods, with each dispenser having 3 periods with the stimulus and 3 periods without the stimulus. The data were recorded and kept in a locked location on campus.

At the end of the study period, the volumes dispensed were examined to determine whether the dispensers with the eyes visual stimulus had a statistically significant difference in volume dispensed when compared with the dispensers without the stimulus. Observation by a third party of hand hygiene practices was not performed to limit potential confounding factors and to limit the stimulus to that solely provided by the image.

Statistical analysis

The numeric measure of volume dispensed (cubic centimeters) was summarized with the sample median (range) or mean (range). The association between the volume dispensed at each alcohol hand sanitizing station and the presence of the visual stimuli (eyes, yes vs no) was analyzed by using repeated mixed-effect modeling with unstructured covariance structure to account for correlation within volume dispensed measurements induced by design. In this mixed-model analysis, the variable that represents hand sanitizing stations was considered the repeated measure variable, and the variable that represents time periods was considered the effect whose levels identify observations belonging to the same subjects or water stations. No adjustment for multiple testing was done in these exploratory analyses. All 2-sided P values $\leq .05$ were considered statistically significant. Statistical analyses were performed using SAS (version 9.2, SAS Institute Inc, Cary, NC) and R Statistical Software (version 2.14.0, R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

The study area was limited to a single-floor perianesthesia area. The employees and users of the area were blinded to the study. Ap-

Table 1

Summary of dispensed volume (cc) at different time periods and according to presence of eyes status at dispensing stations

Time period	Volume dispensed (cc)		
	Total	Eyes: No (n = 2)	Eyes: Yes (n = 2)
Period 1: (n = 4)	325 (150-325)	325 (325-325)	238 (150-325)
Period 2: (n = 4)	250 (150-300)	200 (150-250)	275 (250-300)
Period 3: (n = 4)	225 (100-250)	225 (200-250)	225 (200-250)
Period 4: (n = 4)	250 (175-350)	238 (175-300)	275 (200-350)
Period 5: (n = 4)	363 (250-500)	300 (250-350)	438 (375-500)
Period 6: (n = 4)	200 (175-250)	188 (175-200)	225 (200-250)

NOTE. Values are presented as median (range). N = Number of alcohol handrub dispensing stations at each time point.

Table 2

Distribution of volume dispensed according to presence of eyes at dispensing stations

Variable	Eyes: No (n = 12)	Eyes: Yes (n = 12)
Volume dispensed (cc)	246 (150, 188, 250, 313, 350)	279 (150, 200, 250, 338, 500)

NOTE. The sample mean (minimum, 25th percentile, median, 75th percentile, and maximum) are given for numeric measure of volume dispensed.

proximately 150 employees had access to the area, and this number was stable during the course of the study. Each dispenser was identical in design and manufacture (Purell Advanced Instant Hand Sanitizer Foam, GOJO Industries, Akron, OH), dispensing an AHR that was 70% ethanol (vol/vol), with a drying time of 21 seconds.^{13,14} Each dispenser released a automatically controlled mean foam volume of 1.1 cc per dispensation.¹⁴ Each time period consisted of 2 consecutive weeks. There were a total of 6 time periods. A summary of the dispensed volume is shown in Table 1 for each of the 4 measurements in each specific time period. The largest median volume dispensed was 363 cc (range, 250-500 cc) dispensed during the fifth time period, followed by 325 cc (range, 150-325 cc) dispensed during the first time period. The lowest median volume dispensed was 200 cc (range, 175-250 cc), dispensed during the sixth (final) time period. Table 1 shows the distribution of volume dispensed according to visual stimulus status at hand sanitizing stations. The mean (range) was calculated for each measurement by presence of visual stimulus (eyes) at stations (yes vs no).

Table 2 shows the distribution of volume dispensed according to status of visual stimulus at hand sanitizing stations. The sample mean (minimum, 25th percentile, median, 75th percentile, and maximum) are given for numeric measure of volume dispensed. The average volume dispensed in stations with the visual stimulus was 279 cc versus 246 cc in the stations without the visual stimulus. It was observed that there was a statistically significant difference in the volume of dispensed foam with status of visual stimulus at stations (mean, eyes yes: 279 cc vs eyes no: 246 cc; $P = .009$) under the repeated measure design. The P value was obtained using a repeated measure mixed-model type 3 test analyses, where alcohol dispensing stations were considered the repeated measure.

Figure 2 shows the dispensed volume for the stations at 6 time periods, and Figure 3 shows the dispensed volume at 6 time periods at alcohol dispensing stations with visual stimuli.

DISCUSSION

Prior studies have shown that multifaceted approaches are necessary to improve hand hygiene compliance and that behavior factors are an important part of these interventions.⁹ The use of visual stimuli is prevalent throughout society, from product advertising to religious matters (eg, statues and icons). Kahneman¹⁵ argued that cognition can encompass a rapid automatic process involving as-

Download English Version:

<https://daneshyari.com/en/article/5866435>

Download Persian Version:

<https://daneshyari.com/article/5866435>

[Daneshyari.com](https://daneshyari.com)