Presentation Type:
Poster Presentation

The Use of Light Sensors in Alcohol Gel Dispensers to Improve Hand Hygiene Compliance of Health Care Workers

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Background: Improving adherence to hand hygiene (HH) of healthcare workers (HCWs) is a challenge for health institutions, and the use of technologies has been considered an important strategy within this process. **Methods:** To evaluate the impact of the use of alcohol-based hand rub gel (ABHR) dispensers with light sensors on the adherence to HH by HCWs. This is a prospective quasi-experimental study with comparative analysis between two 4-bed adult intensive care units at a private, tertiary-care hospital conducted over 22 weeks. An approach detection module with an LED lamp was attached to the ABHR dispenser. As a healthcare personnel approached it, the sensor was activated, and a red light turned on as a visual stimulus for HH. The color of the light changed to blue when HH was performed. All ABHR dispensers had electronic counters, but light sensors were installed only in the 4-bed dispensers of the intervention unit. Throughout the period, direct observation of adherence to HH was performed by 4 nurses who had previously been rated with an excellent coefficient of agreement (κ test = 0.951 and 0.902). At the end of the study, a perception survey was performed with the HCWs. **Results:** The median activation of ABHR dispensers per week was higher in the intervention unit with 1,004 (IQR, 706–1,455) versus 432 (IQR, 350–587) in the control group ($P < .001$). The same occurred when compared to the median activation per 1,000 patient days, with 53,069 (IQR, 47,575–67,275) versus 19,602 (IQR, 15,909–24,500) in the control group ($P < .001$). However, there was no evidence of difference in adherence to HH during direct observation between the 2 groups: 51.0% HH compliance (359 of 704) in the control group and 53.8% HH compliance (292 of 543) in the intervention group ($P = .330$). The same result emerged when we evaluated the "My Five Moments for HH" and by professional category. HCWs (N=66) answered the perception survey: 66.6% stated that lighting devices caught their attention regularly or most of the time and 59% agreed that the devices motivated HH. **Conclusions:** Using light sensors in ABHR dispensers can be an effective technology for improving HH. This finding was evident in the evaluation of the number of uses of the ABHR dispensers and in the HCW perceptions. Although direct observation did not show statistical evidence of difference between the groups, adherence was higher in the intervention group.

Funding: None
Disclosures: None
Doi:10.1017/ice.2020.1064

Presentation Type:
Poster Presentation

The Utility of Interaction Design as a Novel Tool to Improve Hand Hygiene Frequency on a Pediatric Hematology-Oncology Ward

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Background: Interaction design offers a novel interventional strategy to enhance hand-hygiene compliance (HHC) and reduce hospital-acquired infections (HAIs) in the pediatric setting. A quality improvement initiative in collaboration with the University of Calgary and Alberta Health Services led to the implementation of a pilot project with sensor-embedded alcohol -based hand rub (ABHR) dispensers at a hematology-oncology and hematopoietic stem cell transplant unit at Alberta Children's Hospital (ACH). **Methods:** Internet of things (IoT) sensors were installed in ABHR dispensers (n = 3) on the unit. Usage data were transmitted to a local server using an MQTT messaging protocol for 16 weeks. Real-time data visualization was presented on a central display next to the nursing station with 11 unique pediatric themes including dinosaurs, transportation, and Canadian animals. Data were collected with and without visualization, and frequency of use (FoU) was determined for both periods. Qualitative interviews with unit stakeholders (n = 13) were held to determine perceptions of the intervention. **Results:** During the first 8 weeks of the study period, the mean daily use without visualization was 47 times (SD, 14.5) versus 99 times (SD, 23.9) with visualization. When accounting for novelty, by removing the first week of data, the mean daily use was 92 (SD 19.6). The percentage increase from period 1 to period 2 was 96.6%, accounting for novelty. Qualitative interviews with stakeholders (n = 13) on the unit indicated that the intervention increased their personal awareness of hand hygiene (75%) and acted as a constant reminder to perform hand hygiene for everyone on the unit including nonclinical staff, patients, and family members (92%). **Conclusions:** These limited data suggest that interaction design may improve HH frequency and show promise as a tool for increased HH awareness and education. Interaction design provides a unique, innovative, and acceptable hand hygiene improvement strategy for staff, patients, and families in the pediatric inpatient setting.

Funding: None
Disclosures: None
Doi:10.1017/ice.2020.1065