



KEY POINT SUMMARY

OBJECTIVES

The study aimed at investigating the effectiveness of a battery-operated touch-free alcohol-based sanitizer dispenser and comparing the impact of dispenser type (touch-free vs. manual) on healthcare workers' hand hygiene compliance.

Hand Hygiene Behavior in a Pediatric Emergency Department and a Pediatric Intensive Care Unit: Comparison of Use of Two Dispenser Systems

Larson, E. L., Albrecht, S., O'Keefe, M.
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Key Concepts/Context

Unwashed hands of healthcare workers often become reservoirs of infectious pathogens and serve as media for pathogen transmission. Hand hygiene is considered as the single most important approach for preventing nosocomial infections. However, the compliance rates of hand hygiene in healthcare workers are typically low. Multiple factors, such as the fragrance of hand hygiene products and the location of sinks and dispensers, may impact hand hygiene compliance rate.

Environmental design may help to increase hand hygiene compliance rate. One design intervention is a type of alcohol-based gel sanitizer dispenser that was battery-operated and touch free. Healthcare workers may be more willing to use the touch-free dispensers because these dispensers are more convenient to use and associated with lower risk of transmitting pathogens through touching contaminated dispenser switches.

Methods

A crossover quasi-experimental study was conducted at the 17-bed emergency department (ED) and 14-bed pediatric intensive care unit (PICU) in a large pediatric hospital. There were two 2-month data collection periods with 1-month interval in between the two periods. During the first data collection period, touch-free dispensers were used in ED and manual dispensers were used in PICU. During the second period, the types of dispensers were switched over between the two units. Staff hand hygiene using soap or alcohol sanitizer was observed and recorded anonymously. Hand hygiene compliance rate was calculated by dividing the number



of observed occurrences of hand hygiene by the number of eight types of hand hygiene opportunities identified according to CDC recommendations. In addition, electronic counting devices were installed on soap and alcohol dispensers to record the number of dispenser uses.

Findings

A total of 5568 hand hygiene opportunities were observed. The overall hand hygiene compliance rate was 38.4%. Alcohol sanitizer dispensers were used in 79.4% of the actual hand hygiene episodes. For the ED and PICU combined, the electronic data showed that touch-free alcohol-based sanitizer dispensers were more frequently used (average 41.2 uses per dispenser per day) than the manual dispensers (25.6 uses per dispenser per day). The observation data showed that touch-free dispensers were used significantly more often for all types of hand hygiene episodes (4.42 vs. 3.33 hand hygiene episodes per patient per hour) and for hand hygiene episodes before direct patient contact (1.58 vs. 1.26 hand hygiene episodes per hour).

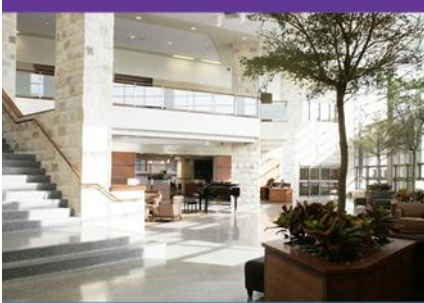
Limitations

There were several limitations of this study:

- Hand hygiene behavior may be ingrained and difficult to change in a short time period therefore the effects of the design intervention might not be fully achieved during the study period.
- The measurement methods of hand hygiene might not be very accurate. Behavioral observation only focused on beds that could be clearly observed therefore the results might not represent the whole unit. Some staff might activate the electronic counting devices more than once during one hand hygiene episode. The touch-free dispensers were placed high on the wall and may be accidentally activated by staff inadvertently entered in the sensor zone. This inconvenience may cause staff's resistance in using the dispensers.
- Behavioral changes in healthcare staff due to the awareness of being observed might have biased the results.
- Only alcohol sanitizer dispensers were changed between manual and touch-free types while manual operated soap dispensers were remained the same throughout the study. The results may not represent the actual full effects of touch-free type of dispensers.

Design Implications

The study demonstrated that easy-to-use hand hygiene devices might contribute to better staff performance in hand hygiene. Hand hygiene equipment design and selection is an important environmental measure for improving hand hygiene.



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Automatic touch-free dispensers and other innovative devices should go through a process of testing and refinement to increase staff's acceptance and improve the effectiveness in practices. Studies should be conducted to establish the cost-effectiveness before wide implementation.