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Major article

A multifaceted pilot program to promote hand hygiene at a suburban fire department

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Background: Firefighters (FFs) and Emergency Medical Services (EMS) personnel provide care in uncontrolled settings, where the risk of hand contamination is great and opportunities for handwashing are few. Knowledge, attitudes, and beliefs about hand hygiene in this group have not been well reported.
Methods: Written surveys were administered to FFs and EMS personnel to assess their practices, attitudes, and beliefs before and after installation of alcohol hand gel dispensers, hanging of reminder posters, and completion of PowerPoint training.
Results: A majority of the participants (n = 131; 58.5%) indicated they had not received any training on hand hygiene from the fire department before the intervention. Responses to Likert scale questions about attitudes, practices, and beliefs regarding handwashing did not reveal any statistically significant differences between preintervention and postintervention surveys; however, responses to direct questions about the impact of the intervention were more promising.
Conclusions: Implementation and evaluation of an intervention to target groups of EMS personnel and FFs can guide future efforts to improve hand hygiene practices in this distinctive group.

Hand hygiene is widely considered the most effective means of controlling the spread of infection.[1-6] Although knowledge, attitudes, and beliefs about hand hygiene have been studied in a wide variety of health care personnel,[5-12] emergency medical service (EMS) personnel and firefighters (FFs) have been neglected in this effort. These personnel operate in atypical health care settings that are often chaotic and poorly lit, in areas without access to running water. Often, after intense patient contacts in the field and in the back of an ambulance, EMS personnel and FFs return to their stations, where they eat and sleep. This unique dormitory-style setting provides a troublesome scenario for potential cross-contamination due to poor hand hygiene.

In a meta-analysis of interventions designed to improve hand hygiene compliance, Pettit[13] found that no one intervention was consistently successful in improving rates of compliance and concluded that "because of the complexity of the process of change, single interventions often fail, and a multi-modal, multi-disciplinary strategy is necessary." The importance of easy access to alcohol hand rubs, cues to action (such as posters), and teaching and promoting hand hygiene have been emphasized in previous promotional campaigns.[2-4,7,9,14]

The objectives of the present study were to describe existing training, practices, beliefs, and attitudes in a sample of EMS personnel and FFs at a suburban fire department, and to assess the effectiveness of a 3-pronged intervention aimed at improving compliance with hand hygiene recommendations.

METHODS

Setting

A multifaceted program was implemented to improve rates of hand hygiene in FFs and EMS personnel at Pasco County Fire Rescue (PCFR) in Florida. PCFR operates 23 fire stations in a 745 square-mile response zone with a combination of suburban and rural characteristics. The county's current layout of fire stations did not provide easy access to soap and water before entering the stations'

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Table 1
Reasons for not washing hands or using alcohol-based hand rub as often as recommended

Barrier	Preintervention,* n (%)	Postintervention,† n (%)	χ^2	*P*
Forgetfulness	65 (28.9)	68 (31.1)	0.25	.619
Difficulty in finding water or hand rub	26 (11.6)	25 (11.4)	0.00	.963
Fatigue	6 (2.7)	10 (4.6)	1.15	.283
Belief that wearing gloves is a substitute for hand hygiene	18 (8)	24 (11.0)	1.13	.786
Belief that hand hygiene is not important	0 (0)	4 (1.8)	4.07‡	.06
Belief that hand hygiene is too time- consuming	2 (0.9)	4 (1.8)	0.69	.40

* n=225.
† n=219.
‡ Fisher's exact test.

living quarters. Alcohol-based hand rub was not readily available before the intervention. Implementation of a hand hygiene promotion program was complicated by a severe budget crisis, resulting in an overall budget decrease of $12 million (14%) in the 2-year period ending in 2010.[15] This decrease reduced or eliminated existing programs within the department and did not allow for the development of new initiatives.

Assessment

All assessments and interventions used in this study were approved by the University of South Florida's Institutional Review Board. Before the intervention, a 2-page, 16-item written survey was collected over a 12-day period in September 2009 through interoffice mail. This survey included Likert scale questions regarding attitudes, practices, and beliefs, as well as questions about barriers to and previous training on handwashing. A similar postintervention survey, revised to include 6 questions about the effectiveness of the interventions, was circulated over a 12-day period in May 2010. The Rescue Chief sent an interoffice memorandum requesting participation and stressing the importance of the project with each set of surveys. To protect the anonymity of responses, identifying information was not collected; thus, the preintervention and postintervention surveys could not be matched.

Intervention

A 10-minute PowerPoint presentation on the importance of hand hygiene was posted on each fire station's shared computer's hard drive. The presentation was prepared by the Hand Hygiene Resource Center based at the Saint Raphael Healthcare System in Connecticut.[16] In November and December 2009, employees were instructed to view the presentation and provide written documentation of this task to the Training Division. There was no cost associated with this activity.

Between October 2009 and December 2009, 2 alcohol-based hand rub dispensers and laminated 8- × 10-inch posters carrying messages about the importance of hand hygiene were mounted in each station, within visual range when entering the station from the exterior vehicle bays. The content of the posters was obtained from the Centers for Disease Control and Prevention[17] and the US Veterans Administration.[18] An alcohol-based hand rub dispenser also was mounted in the interior of the ambulances, and additional hand hygiene posters were placed in the bathrooms. The posters were printed using existing supplies, and laminating supplies cost approximately $100. Alcohol-based hand rub dispensers were provided free of charge by the manufacturer (State Chemical, Cleveland, OH); PCFR was responsible for purchasing refills for the dispensers ($6.34 per 1,000 mL).

Data analysis

Data were entered and analyzed using EpiInfo version 3.5.1. For one specific 5-point Likert scale question ("There are many risks associated with this job—catching an illness does not worry me"), "strongly disagree" and "somewhat disagree" responses were coded as "disagree to some extent" responses, and "no opinion," "somewhat agree," and "strongly agree" responses were coded as "agree to some extent." For all other Likert scale questions, "strongly agree" and "somewhat agree" answers were coded as "agree to some extent" responses, and "no opinion," "somewhat disagree," and "strongly disagree" response were coded as "disagree to some extent."[5,7] Univariate analysis was performed, and barriers were compared as proportions using either the χ^2 or Fisher's exact test.

RESULTS

Preintervention

A total of 228 surveys were returned from 397 employees, for a response rate of 58.9%. A majority of participants (n = 131; 58.5%) indicated they had not received any training on hand hygiene from the fire department during the term of their employment. Respondents identified barriers such as forgetfulness (28.9%), difficulty finding water or hand rub (11.6%), belief that wearing gloves was a substitute for hand hygiene (8%), and fatigue (2.7%) (Table 1). Responses to Likert scale questions regarding practices, attitudes, and beliefs are summarized in Table 2. In terms of reporting their own compliance with hand hygiene, 94% of respondents agreed to some extent that they consistently practiced hand hygiene when returning to the station after a call and after transporting a patient, However, participants seemed less confident regarding compliance of their coworkers. Only 71.9% and 68.9% agreed to some extent that their coworkers were regularly practicing hand hygiene after patient contact and when returning to the station from a call, respectively.

Postintervention

In the postintervention phase, 219 surveys were returned, for a 60% response rate. The total number of employees had decreased to 364 due to attrition since the preintervention surveys. More than 92% of employees indicated that they had received training on hand hygiene while employed at PCFR ($P = .000$). Several barriers to hand hygiene compliance were reported frequently, including forgetfulness (31.1%), the belief that wearing gloves is a substitute for poor hygiene (11%), and fatigue (4.6%). Two barriers that were not identified in the preintervention survey but were reported by 1.8% of postintervention participants were the beliefs that hand hygiene is not important and is too time-consuming (Table 1). However, there were no statistically significant differences in identified barriers to practicing hand hygiene between the preintervention and postintervention surveys. Responses to Likert scale questions regarding attitudes, practices, and beliefs about handwashing were not statistically significantly different between the preintervention and postintervention surveys (Table 2). Responses to direct questions about the impact of the intervention were more positive (Table 3).