

CONCISE COMMUNICATION

Hand Hygiene in Long-Term Care Facilities: A Multicenter Study of Knowledge, Attitudes, Practices, and Barriers

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An anonymous survey of 1143 employees in 17 nursing facilities assessed knowledge of, attitudes about, self-perceived compliance with, and barriers to implementing the 2002 Centers for Disease Control and Prevention hand hygiene guidelines. Overall, employees reported positive attitudes toward the guidelines but differed with regard to knowledge, compliance, and perceived barriers. These findings provide guidance for practice improvement programs in long-term care settings.

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Previous research, almost exclusively conducted in hospital or outpatient settings, has shown that hand hygiene practices and compliance differ on the basis of healthcare workers' perception, knowledge, and work setting.¹⁻³ However, there is a dearth of literature on hand hygiene practices specific to long-term care facilities (LTCFs). A couple of studies have addressed the influence of knowledge, perceptions, and beliefs among nursing home employees regarding hand hygiene or have researched the effects of various interventions.^{4,5} However, the authors of those studies did not seek to explore the practical barriers reported by employees in the course of their clinical duties. Thus, we examined the differences in knowledge about and attitudes toward hand hygiene, as well as self-perceived obstacles to compliance with hand hygiene guidelines, among healthcare workers employed in nursing homes, with the aim of facilitating timely development of programs geared toward improving hand hygiene practices in the LTCF industry.

METHODS

We developed an anonymous 52-question survey based on 2002 Centers for Disease Control and Prevention (CDC) guidelines to determine knowledge about, self-reported com-

pliance with, self-perceived barriers to, and attitudes of healthcare workers about current recommendations for hand hygiene.⁶ Questions were either adapted from existing surveys of attitude, compliance, and knowledge of healthcare workers or were similarly modeled.^{7,8} Additional knowledge and barrier questions were developed on the basis of data presented in the 2002 CDC guidelines.⁶ The selection process for LTCFs involved a convenience sample, which was based on investigators' ability to contact medical directors or administrators of those facilities and to receive institutional review board approval for conducting the study. All healthcare professionals who had contractual employment with those LTCFs—including, but not limited to, physicians, nurses, certified nursing assistants (CNAs), social workers, physical and occupational therapists, dietitians, and housekeeping personnel—were eligible to participate. Anonymous surveys were distributed in prescheduled department meetings. All employees had the opportunity to participate unless they were absent on the day of survey. Data collection included age, sex, ethnicity, job category, number of years in healthcare, and frequency of hand hygiene orientation and training.

The statistical analyses primarily focused on examining the variation within the sample population and concentrated on the use of descriptive statistics to highlight knowledge, attitudes, practices, and barriers to hand hygiene. In addition, univariate analyses were used to illustrate differences in these dimensions among professional groups (CNAs, nurses, and other healthcare professionals). These dimensions were also examined across other demographic variables. Categorical variables were analyzed using the χ^2 test or Fisher exact test, as appropriate. Analysis of variance or *t* tests were used to analyze continuous variables. The analysis was not adjusted for facility characteristics because of the unavailability of facility data.

RESULTS

Surveys were returned by 1,143 subjects employed at 17 nursing facilities located in New York ($n = 860$), Ohio ($n = 90$), Minnesota ($n = 85$), Illinois ($n = 61$), Florida ($n = 37$), and California ($n = 10$). Because the facilities did not provide employee's attendance documentation, we were unable to calculate a response rate. Approximately one-half of the employees (588 [50.8%]) were in the age range of 40–59 years, only 78 participants (6.8%) were older than 60 years, and the majority of participants (925 [80.9%]) were female. The study population was diverse with regard to ethnicity, with 432 white persons (37.8%), 423 African American persons (37.0%), 101 Asian persons (8.8%), and 64 Hispanic persons (5.6%). Approximately one-half the respondents (604

TABLE 1. Rate of Correct Response for Knowledge-Based Questions

Statement	Nurses (n = 363)	CNAs (n = 375)	Other HCWs (n = 370)	P ^a
Healthcare-associated pathogens can be found not only from infected wounds but also from frequently colonized areas of normal intact patient skin	338 (93.1)	340 (90.7)	322 (87.0)	.020
Wearing gloves doesn't result in complete protection from getting certain infections	307 (84.6)	292 (77.9)	273 (73.8)	.002
Hand washing can reduce the rate of healthcare associated infections	361 (99.4)	368 (98.1)	368 (97.6)	NS
If my hands are not visibly dirty, there is no need to wash my hands before contact with patients	351 (96.7)	362 (96.5)	361 (97.6)	NS
If my hands are visibly dirty, I should wash my hands only with an alcohol based rub	348 (95.9)	343 (91.5)	331 (89.5)	.004
There is no need to wash hands before doing certain procedures like urinary catheters	355 (97.8)	365 (97.3)	362 (97.8)	NS
I should wash my hands after contact with body fluids, even if my hands are not visibly dirty	362 (99.7)	371 (98.9)	360 (97.3)	.015
When dealing with the same patient: if I have touched or cleaned a contaminated body site and I have to touch or take care of another clean body site, I should wash my hands again	347 (95.6)	358 (95.5)	338 (91.4)	.02
I should wash my hands after taking a patient's blood pressure or shaking hands with the patient	302 (83.2)	329 (87.7)	283 (76.5)	<.001
I should wash my hands after touching any medical equipment or personal belongings in the patient's room even if I have not touched the patient	324 (89.3)	335 (89.3)	311 (84.1)	.045
I should wash my hands after taking off gloves even if I have not touched the patient with my hands	347 (95.6)	367 (97.9)	327 (88.4)	<.001
I should wash my hands with soap for at least (A) 10 seconds, (B) 15 seconds, (C) 25 seconds, (D) 30 seconds, or (E) not sure	220 (60.6)	214 (57.1)	184 (49.7)	.010
I should avoid washing my hands with hot water as it can damage my skin	168 (46.3)	147 (39.2)	77 (20.8)	<.001
After washing my hands with soap and water I should turn off the faucet by using the back of my hand	292 (80.4)	322 (85.9)	276 (74.6)	.001
When I am using alcohol-based rubs I should keep rubbing my hands until they are completely dry	270 (74.4)	262 (69.9)	263 (71.1)	NS
My hand nails should not be longer than (A) 1/4 inch, (B) 1/2 inch, (C) 1 inch, (D) don't know	281 (77.4)	267 (71.2)	256 (69.2)	.034
I should use hand lotions or creams periodically to keep my hands healthy	334 (92.0)	327 (87.2)	301 (81.4)	<.001
Wearing artificial nails can increase the chance of harboring bacteria on fingertips	355 (97.8)	355 (94.7)	339 (91.6)	.001
Fresh nail polish will increase the number of bacteria on the skin surrounding the nails	102 (28.1)	100 (26.7)	74 (20.0)	.025

NOTE. The answers were recorded either as a "true/false" response or "choose the best one" format. CNA, certified nursing assistant; HCW, healthcare worker; NS, not significant.

^a P values are shown for statistically significant differences among the 3 groups.

[52.8%]) reported having worked in a healthcare setting for less than 10 years. Among the 1,108 participants who provided information on career status, employees were grouped as follows: CNAs, 375 respondents (33.8%); nurses, 363 respondents (32.8%); and "other," 370 respondents (33.4%). The "other" healthcare worker group included 94 occupational and physical therapists (8.5%), 49 housekeeping personnel (4.4%), 31 dietitians (2.8%), 26 physicians (2.3%), 20 social workers (2.2%), and 142 other employees (12.8%) in roles such as administration, clerical workers or unit secretaries, maintenance workers, or kitchen staff.

Most respondents (956 [83.6%]) reported familiarity with the CDC guidelines. Overall, employees had positive attitudes about the 2002 guidelines, and 829 participants (86.6%) be-

lieved that those guidelines are indeed relevant to nursing facilities. However, one-third of study subjects (281 [29.7%]) stated that they would not change their hand hygiene practices, regardless of guidelines' recommendations, and some (186 [19.8%]) felt that the guidelines were not practical.

Nurses were more likely to answer most of the questions correctly, compared with CNAs and other professionals (Table 1). The 3 groups had different responses with regard to identifying barriers (Table 2). Nurses and CNAs were more likely than others to strongly agree to always wash one's hands when they are visibly dirty (219 [60.5%], 206 [56.0%], and 166 [45%], respectively; $P < .001$), when they are not visibly dirty (224 [62.0%], 210 [57.4%], and 157 [42.8%], respectively; $P < .001$), and after removing gloves (221 [61.2%], 230

TABLE 2. Healthcare Worker's Self-Perceived Barriers to Hand Hygiene

Statement, group	No. (%) of respondents, by response		P ^a
	Never to rarely	Sometimes to always	
Forgot to wash hands because busy			
Nurses	234 (65.0)	126 (35.0)	<.001
CNAs	290 (78.4)	80 (21.6)	
Other HCWs	207 (55.9)	163 (44.1)	
Just forgot to wash hands			
Nurses	289 (80.5)	70 (19.5)	<.001
CNAs	327 (89.1)	40 (10.9)	
Other HCWs	267 (72.6)	101 (27.4)	
Didn't wash hands because neither seniors nor colleagues did			
Nurses	344 (95.3)	17 (4.7)	NS
CNAs	345 (94.0)	22 (6.0)	
Other HCWs	344 (94.5)	20 (5.5)	
Didn't wash hands because resident didn't have serious medical problems			
Nurses	308 (86.0)	50 (14.0)	.009
CNAs	329 (89.9)	37 (10.1)	
Other HCWs	295 (81.9)	65 (18.1)	
Didn't wash hands because of absence of soap and paper towel			
Nurses	303 (84.6)	55 (15.1)	<.001
CNAs	332 (91.7)	34 (9.3)	
Other HCWs	287 (78.2)	80 (21.9)	
Didn't wash hands because patients needed immediate medical attention			
Nurses	250 (69.6)	109 (30.4)	NS
CNAs	276 (75.0)	92 (25.0)	
Other HCWs	264 (72.7)	99 (27.3)	
Didn't wash hands because wearing gloves			
Nurses	277 (76.9)	83 (23.1)	.007
CNAs	307 (83.4)	61 (16.6)	
Other HCWs	264 (73.9)	93 (26.1)	
Unable to wash hands because no alcohol-based rubs nearby			
Nurses	258 (71.5)	103 (28.5)	<.001
CNAs	312 (84.3)	58 (15.7)	
Other HCWs	219 (61.3)	138 (38.7)	
Afraid to wash hands because skin be harmed with repeated hand washing			
Nurses	338 (93.1)	25 (6.9)	NS
CNAs	347 (94.3)	21 (5.7)	
Other HCWs	339 (91.6)	31 (8.4)	
Unable to wash hands because no sink nearby			
Nurses	299 (82.8)	62 (17.2)	<.001
CNAs	343 (92.5)	28 (7.5)	
Other HCWs	273 (75.28)	87 (24.2)	
Didn't wash hands because just went into patient's room to talk			
Nurses	110 (30.7)	248 (69.3)	<.001
CNAs	190 (51.9)	176 (48.1)	
Other HCWs	136 (37.6)	226 (62.4)	
Got personal feedback regarding the practice of hand hygiene			
Nurses	188 (52.8)	168 (47.2)	<.001
CNAs	167 (46.1)	195 (53.9)	
Other HCWs	250 (68.5)	115 (31.5)	
Got periodic education by infection control team regarding need of hand hygiene			
Nurses	29 (8.1)	331 (91.9)	.027
CNAs	31 (8.4)	338 (91.6)	
Other HCWs	49 (13.4)	317 (86.6)	

NOTE. CNA, certified nursing assistant; HCW, healthcare worker; NS, not significant.

^a P values are shown for statistically significant differences among the 3 groups.

[62.0%], and 162 [44.0%], respectively; $P < .001$). In general, employees who never or rarely encountered the barriers mentioned in Table 2 were more likely to strongly agree to always wash one's hands.

In a separate analysis, we grouped the employees on the basis of their scores on knowledge-related questions as top scorers (score, more than 85%; 339 respondents), average scorers (score, 75%–85%; 473 respondents), and bottom scorers (score, less than 75%; 331 respondents). The group that was more knowledgeable was also more likely to choose a “strongly agree” response for questions assessing compliance with always washing their hands when they are visibly dirty (223 top scorers [66.4%], 248 average scorers [52.8%], and 131 bottom scorers [40.8%]; $P < .001$), when they are not visibly dirty (218 [64.7%], 246 [52.8%], and 140 [44.2%], respectively; $P < .001$), and after removing gloves (234 [69.4%], 270 [57.7%], and 122 [37.9%], respectively; $P < .001$). It was also noted that approximately one-fifth of all employees (231 [20.8%]) did not receive any hand hygiene training or orientation in the prior year or were not sure whether they had received training. Employees who reported receiving periodic education were significantly more likely to report washing hands when they are visibly dirty, when they are not visibly dirty, and after the use of gloves ($P = .039$, $P = .002$, and $P < .001$, respectively).

DISCUSSION

Although a large majority of employees reported being familiar with CDC guidelines, only one-third scored greater than 85% on knowledge questions (median, 79%), thus identifying unique opportunities for targeted quality improvement programs on hand hygiene, because the higher-scoring employees did report being more compliant. This finding is particularly relevant, because we demonstrated that the group of healthcare workers other than nurses and CNAs was less likely to report receiving periodic education and personal feedback and reported less compliance. Because this group, which included occupational and physical therapists, nutritionists, and social workers, has frequent and consistent direct patient interactions, it should be encouraged to participate in educational and training programs on hand hygiene.

In addition, we identified barriers to hand hygiene in nursing home settings, such as absence of alcohol-based hand rub or absence of nearby sink or soap and paper towel. These factors have been well recognized in acute care settings, as evidenced by the prevalence of hand sanitizers throughout hospitals in the United States, but have yet to be extensively studied in LTCFs in the United States. In fact, similar barriers have been reported for nursing facilities in other countries.^{9,10}

In summary, this multicenter study, which included a large sample of nursing home employees, underscores the impact of knowledge on self-reported compliance with hand hygiene guidelines and highlights the barriers encountered by health-

care employees in LTCFs. In light of the growing number of older adults who will become residents of LTCFs in the near future, it is imperative that we provide educational programs for all nursing home employees and resolve the practical impediments to hand hygiene practices.

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