

Perception of health-care workers about hand hygiene and its resources at King Fahad Hospital of University

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Received August 17, 2015. Accepted October 13, 2015

Abstract

Background: Transmission of pathogens via health-care workers' hands is one of the most frequent means of spreading multiresistant organisms and the occurrence of health-care-associated infections. Hand hygiene is the simplest, most effective method to prevent cross-infections. Hand hygiene perception plays an important role in determining hand hygiene compliance.

Objective: To assess physicians' perceptions and the available resources for hand hygiene at King Fahad Hospital of University.

Materials and Method: A cross-sectional study was used on 209 physicians. Data were collected using a World Health Organization Self-Report Questionnaire and a checklist for availability of hand hygiene resources.

Result: More than half of the sample was male subjects (55.5%), with a mean age of (30 ± 6.5 years). About 44% showed positive perception, and 38% were neutral about the importance of hand hygiene. The frequent use of alcohol-based handrub was significantly associated with positive perception of importance of hand hygiene ($P = 0.031$). Nonhuman resources of hand hygiene were available in all the departments, except for hand cream or lotion.

Conclusion: Accordingly, we recommend raising the patients' awareness about their right to remind health-care workers to clean their hands. Moreover, during training of health-care workers, the trainer should remind the health-care workers that the patient has the right to ask them to wash their hands.

KEY WORDS: Hand hygiene, perception, health-care workers, resources

Introduction

In 2002, the estimated number of health-care-associated infections (HAIs) in the US hospitals was approximately 1.7 million.^[1] The survey carried out in February 2006 to May 2006 in England, Wales, Northern Ireland, and the Republic of

Ireland on adult patients to evaluate the occurrence of HCAs showed it to be 8.19% in England, 6.35% in Wales, 5.43% in Northern Ireland, and 4.89% in the Republic of Ireland.^[2]

Of all the HCAs, the commonest was gastrointestinal (20.6%), followed by urinary tract (19.9%), surgical site (14.5%), pneumonia (14.1%), skin and soft tissue (10.4%), and primary bloodstream (7.0%). The prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) was 1.15% with MRSA being the causative organism in 15.8% of all system infections. The prevalence of *Clostridium difficile* was 1.21%. This HCAI prevalence survey involving the four countries was the largest one ever conducted.^[2] In Saudi Arabia, the reports on the epidemiology of MRSA infection are very few. Of all the MRSA isolates, 62% represented community-acquired infection, 20.4% represented HCAs, and 17.6% represented nosocomial infection.^[3] Therefore, it is important to study the

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Website: <http://www.ijmsph.com>

DOI: 10.5455/ijmsph.2016.17082015127

Quick Response Code:



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perception of the health-care workers about infection control in Saudi Arabia.

Patient safety is questioned majorly by HCAs. Therefore, its observation and inhibition should be a top primacy for settings and institutions dedicated to provide safer health care. HCAs effects include extended hospital stay, long-term disability, enhanced resistance of microorganisms to antimicrobials, huge added financial load, high costs for patients and their families, and increased number of deaths.^[4]

Hand hygiene is a compliance of cleansing hands using soap and water or using antiseptic handrub for removal of transient microorganisms from hands in a way keeping the skin condition. Any action of hand cleaning is referred to as hand hygiene.^[5] Hand hygiene is the simplest and effective measure to prevent infections.^[5] However, about 50% of HAIs occur because hands of health-care providers (HCPs).^[6] HCPs' hands are the commonest mode of transmission of HCAs.

Microorganisms can stay for 2–60 min on HCPs' hands.^[4] Unless the HCPs kept compliance with hand hygiene, their hands will be contaminated with these microorganisms. HAI via the health-care workers' hands is mainly because of their worse hand hygiene.^[7] Therefore, compliance with hand hygiene is the easiest and the highly valued mode of infection prevention in hospitals. Hand hygiene compliance is the way of minimizing the transmission of microorganisms, which may be multidrug resistant for those patients who have been infected and admitted to the hospital.^[8]

About 5%–10% of the patients who are admitted in the hospital are at risk of acquiring an infection.^[4] There are five movements for hand hygiene: moment one is before touching a patient, moment two before a clean/aseptic procedure, moment three after body fluid exposure risk, moment four after touching a patient, and, finally, moment five after touching patient surroundings.^[9]

The WHO recommended that HCPs clean their hands with soap and water: (a) when visibly dirty or visibly soiled with blood or other body fluids or after using the toilet^[10] and (b) if exposure to potential spore-forming pathogens is strongly suspected or proven, including outbreaks of *C. difficile*.^[11,12] If hands are not visibly soiled, WHO recommended the use of an alcohol-based handrub as the preferred means for routine hand antisepsis in all other clinical situations (i.e., before and after touching the patient^[13]; before handling an invasive device for patient care, regardless of whether or not gloves are used^[14]; and after contact with body fluids or excretions, mucous membranes, nonintact skin, or wound dressings^[15,16]). The final recommendation was: if handrub is not available, wash hands with soap and water."

Despite of these clear recommendations, HCPs are still noncompliant to handwashing. The causes for poor hand hygiene obedience by HCPs, and particularly physicians, are less understood. Studies investigating HCPs generally have reported a range of barriers, including environmental barriers (e.g., lack of access to sinks, difficulty of locating products, empty dispensers, and time constraints) and personal barriers

(e.g., attitudinal beliefs and skin irritation from repeated hand-washing). With respect to barriers specific to physicians, research is limited.

A recent study on physicians' attitudes toward hand hygiene showed "remembering to perform hand hygiene" and "high workload or feeling too rushed" as the highest barricades to their hand hygiene compliance.^[17] Furthermore, this study found the dominancy of environmental barricades in hand hygiene obedience, such as lack of soap, broken soap dispensers, and lack of paper towels.^[17]

The major goal of the current study was to assess the human and nonhuman resources for hand hygiene at King Fahad Hospital of University (KFHU). The specific aim of this study was to assess the level of physicians' perception about hand hygiene.

Methodology

Design, Setting, and Sample

A cross-sectional study was conducted in KFHU in Eastern Province, KSA. A convenience sample of 62 specialists, 86 residents, and 61 interns working in all the clinical departments of KFHU during research time were included in the study.

Ethical Considerations

The study was approved by the regional Institutional Review Board (IRB) committee of Saudi Board of Family Medicine, University of Dammam, and KFHU number (KFHU-EXEM 0038). All participants signed informed consent before the data collection. Participation was voluntary. The research team informed the participants about their right to withdraw from the study at any time without giving a reason, causing no penalty or loss of benefits to them. Data gained from the study was kept in a secure place of storage only accessible by the researcher.

Data Collection Instruments

Self-Report Questionnaire

All physicians answered a self-report questionnaire about their perceptions regarding a number of factors related to hand hygiene. The questionnaire was based on the Knowledge and Perception Survey for Health-Care Workers of the WHO 2009.^[18,19] It included a total of 22 questions distributed as the following: 7 demographic and 4 about the importance of hand hygiene and effect of HCAs on clinical outcomes. The remaining 11 questions were a Likert-scale type about how effective would be some actions in improving hand hygiene in the institution. Scores of 1 and 2 were considered as not effective, 3–5 as neutral, and 6 and 7 as effective measures of hand hygiene.

Demographic Data and Characteristics Checklist

We developed a checklist to assess the availability of resources of hand hygiene in all the departments of KFHU

(outpatients clinics and inpatient wards), which included: availability of running water and alcohol-based handrub in each clinic and ward, types of alcohol-based handrub used, safe place out of reach of children, and the availability of creams and disposable gloves in each department.

Data Analysis

All data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL, USA), version 20. Percentages were used to describe positive, neutral, and negative perceptions of the physicians. *T* test and one-way ANOVA was performed to test the differences between/among mean perception scores of hand hygiene of KFUH physicians by professional data. Alpha was set at level of 0.05 a priori.

The total perception scores were calculated. The maximum perception score was 85. We also categorized it into positive if the score was above 80% of maximum (more than 68), neutral if the score was between 60% and 80% of maximum (52–68), and negative perception if the score was less than 60% of maximum (less than 51).

Results

KFHU Physician's Perception of Importance of Hand Hygiene

Two hundred thirty questionnaires were distributed. Two hundred nine participants returned the questionnaires resulting with a response rate of 90.9%. Table 1 showed that more than half of the physicians were male subjects (55.5%), with a mean age of 30 ± 6.5 years. About one-third were specialists (29.7%), 40% were residents, and the rest were interns. Half of them (50.2%) received training in hand hygiene, and about 90% reported routine use of alcohol-based handrub. The average number of patients seen per day per physician was 12 ± 8 .

About 44% of physicians showed positive perception of importance of hand hygiene, 38% neutral perception, and 18% negative perception. Two-thirds of KFHU physicians reported that: (a) the health-care facility makes alcohol-based handrub always available at each point of care, (b) it is important to perform a good hand hygiene when caring for patients, (c) leaders and senior managers support and openly promote hand hygiene, and (d) clear, simple instructions for hand hygiene are made visible for every HCP.

About half of the physicians reported that hand hygiene posters are displayed at point of care as reminders and that colleagues and head of departments attach to the fact that physicians perform optimal hand hygiene. About 40% reported that each HCP receives education on hand hygiene; that HCPs regularly receive feedback on their hand hygiene performance; and that patients are invited to remind HCPs to perform hand hygiene [Table 2].

The mean perception score of physicians using alcohol-based handrub was significantly better than that of physicians

not using handrub ($P = 0.031$). However, no significant difference was detected in perception score by gender, profession, training in hand hygiene, and medical speciality [Table 3]. The average number of patients seen per day per physician using alcohol-based handrub was higher than among physicians not using alcohol-based handrub (mean, 13.02 and 11.50, respectively), but the difference was not statically significant ($P = 0.31$).

Hand hygiene resources were available in all the departments including sink and running water. Wall dispenser alcohol-based handrub was available and out of reach of children. Disposable gloves were available in each department. There was an assigned nurse responsible for refilling or replacement of empty alcohol-based handrub dispensers. However, only the skin care products such as creams or hand lotions were not available in all the departments.

Discussion

Hand hygiene is the easiest way to reduce HAIs and cross-transmission of infectious microorganisms in the hospitals. This study suggested that there was a wide scope for improvement in hand hygiene practices, and it was interesting to note that about half of the physicians had received formal training in hand hygiene. Despite the fact that hand hygiene is considered the best measure for infection control, worldwide compliance of health-care workers with hand hygiene was poor.^[4]

In our study, about 90% of the physicians showed adherence to using alcohol-based handrub for hand hygiene. In addition, almost all the physicians felt that the facility and resources available for hand hygiene were adequate, and it was the main reason for their compliance. Investigating the perception of the effectiveness of measures for improving hand hygiene is a key factor in promoting adherence. Our results revealed positive perception of importance of hand hygiene among 44% of KFHU physicians. The availability of alcohol-based handrub was considered the most useful measure for hand hygiene, while the importance of inviting patients to remind HCPs to perform hand hygiene was the least considered measure.

Alcohol-based handrub reduces bacterial microflora of hands,^[20] increases handwashing adherence and frequency,^[21,22] and decreases the occurrence of nosocomial infections.^[23] The availability of alcohol-based handrub solution at the point of care is also a strong predictor of physicians' adherence to hand hygiene.^[24] Thus, the availability of handrub has greatly modified the hand hygiene practices and is now considered to be a standard of care.^[4] In our study, it was observed that alcohol-based handrub was available in all the departments of KFHU. Moreover, the positive perception of its usefulness in improving adherence confirms that it is a crucial part of multimodal interventions for promoting hand hygiene. The high proportion of physicians reporting that alcohol-based handrub was available is also reassuring.

Table 1: Description of study sample

Professional data	KFHU physicians ($\mu = 209$)	
	Frequency	%
Gender		
Male	116	55.5
Female	93	44.4
Profession		
Specialist	62	29.7
Resident	86	41.1
Intern	61	29.2
Medical specialty		
Major ^a	72	34.4
Minor ^b	137	65.6
Training in hand hygiene		
Yes	105	50.2
No	104	49.8
Using alcohol-based handrub		
Yes	187	89.5
No	22	10.5

^aMajor specialty includes internal medicine, general surgery, pediatrics, and obstetrics and gynecology.

^bMinor specialty includes cardiology, nephrology, neurology, dermatology, psychiatry, plastic surgery, cardiothoracic surgery, vascular surgery, pediatric surgery, urology, orthopedics, family medicine, ENT, ophthalmology, and neurosurgery.

Table 2: Perception of KFHU physicians of importance of hand hygiene

Perception items	Perception of physicians ($\mu = 209$)					
	Not effective		Neutral		Effective	
	?	%	?	%	?	%
Leaders and senior managers at your institution support and openly promote hand hygiene.	14	6.7	73	34.9	122	58.3
The health-care facility makes alcohol-based handrub always available at each point of care.	5	2.4	41	19.6	163	78.0
Hand hygiene posters are displayed at point of care as reminders.	12	5.7	84	40.2	113	54.0
Each health-care worker receives education on hand hygiene.	33	15.8	89	42.6	87	41.6
Clear and simple instructions for hand hygiene are made visible for every health-care worker	10	4.8	79	37.8	120	57.4
Health-care workers regularly receive feedback on their hand hygiene performance.	43	20.6	85	40.7	81	38.8
You always perform hand hygiene as recommended (being a good example for your colleagues).	5	2.4	65	31.1	139	66.5
Patients are invited to remind health-care workers to perform hand hygiene.	43	20.5	86	41.2	80	38.3
What importance does the head of your department attach to the fact that you perform optimal hand hygiene?	20	9.5	89	42.6	100	47.8
What importance do your colleagues attach to the fact that you perform optimal hand hygiene?	8	3.8	86	41.1	115	55.0
How do you consider the effort required by you to perform good hand hygiene when caring for patients?	1	0.05	66	31.6	142	67.9

Table 3: Mean perception score of hand hygiene of KFUH physicians by professional data

Professional data	Physicians perception ($\mu=209$)			
	?	Mean	SD	I
Gender				
Male	116	64.34	12.33	0.803
Female	93	64.75	12.96	
Profession				
Specialist	62	64.45	12.43	0.941
Resident	86	64.86	12.41	
Intern	61	64.13	13.17	
Medical specialty				
Major ^a	72	64.65	11.87	0.325
Minor ^b	137	64.45	12.98	
Training in hand hygiene				
Yes	105	67.33	11.42	0.177
No	104	61.69	13.12	
Using alcohol-based handrub				
Yes	187	64.66	12.28	0.031
No	22	63.36	15.22	

^aMajor specialty includes internal medicine, general surgery, pediatrics, and obstetrics and gynecology.

^bMinor specialty includes cardiology, nephrology, neurology, dermatology, psychiatry, plastic surgery, cardiothoracic surgery, vascular surgery, pediatric surgery, urology, orthopedics, family medicine, ENT, ophthalmology, and neurosurgery.

In interpreting our results, it should be considered that the study was conducted in winter of 2013 and spring of 2014, the time of corona virus epidemic; which resulted in many public health campaigns for promoting interventions for reducing viral transmission, which included recommendations for hand-washing. These campaigns, together with medical health education, could have contributed to improving the perception of the usefulness of alcohol-based handrub.

Nonetheless, our results stressed that the patients' role in improving the hand hygiene of physicians deserves attention, as only 38% of the physicians perceived the importance of patients reminding them about hand hygiene. Various studies have shown that patients are not very willing to ask a nurse or physician to perform hand hygiene or to verify if they have washed their hands.^[25-27] Furthermore, the study conducted in University of Oregon, USA, in 2005 for assessing the methods of reducing medical errors, revealed that patients asking HCPs about hand hygiene was perceived to be the least useful and the least likely method to be undertaken by patients.^[28] The readiness of the patients to ask HCPs' actions is possibly affected by various factors, such as the geographical setting, sociodemographic factors, and personality traits, along with the way in which patients are questioned about this willingness.^[25,29] A promising avenue is to encourage patients to remind HCPs to perform hand hygiene before

caring for them.^[30] This strategy has been recommended by a large number of organizations and authorities worldwide, including the WHO and the US Centers for Disease Control and Prevention (CDC).^[4]

Conclusion

Investigating physicians working at KFHU for knowledge and perception for hand hygiene can provide useful information for implementing actions for hand hygiene promotion in hospital and reduce number of HCAs. From the current study, it was concluded that half of the physicians of KFHU received training in hand hygiene. However, about 90% reported routine use of alcohol-based handrub, as nonhuman resources of hand hygiene were available in all the departments of KFHU except for the hand cream or lotion, which were recommended by the WHO to increase the adherence to hand hygiene among HCPs.

Poor perception of inviting patients to remind physicians to perform hand hygiene has been observed and deserves further investigation. Availability of alcohol-based handrub was perceived as the most useful action for improving adherence to hand hygiene and patients invited to remind HCPs to perform hand hygiene.

Accordingly, we recommend raising the patients' awareness about their right to remind HCPs to clean their hands according to "My 5 Moments for Hand Hygiene" approach. In addition, it is recommended to display posters in visible places for patients to remind HCPs to clean their hands. During the training of HCPs, the trainer should remind the HCPs that the patient's right has the right to remind them to clean their hands. Moreover, HCPs should be reminded about situations where handrubbing might be used instead of handwashing to increase their compliance with hand hygiene.

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How to cite this article: Zabeeri N, Amar NA, AbuRuz ME, AlQurneh H, Mutairi BA. Perception of health-care workers about hand hygiene and its resources at King Fahad Hospital of University. *Int J Med Sci Public Health* 2016;5:307-312

Source of Support: Nil, **Conflict of Interest:** None declared.