

# Physicians knowledge about hand hygiene at King Fahad Hospital of University, Dammam, KSA

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## Abstract

**Background:** Healthcare-associated infections are a serious problem resulting in an extra burden on the patients and the hospitals. Most of these infections occur because of the transmission of microorganisms through the hands of the healthcare workers. The World Health Organization and the Center for Disease Control recommended hand hygiene as the simplest and most effective method in controlling these infections. However, physicians, as all other healthcare providers, lack the compliance to hand hygiene. Different factors play a role in this noncompliance (i.e., knowledge, availability of resources, stress, workload, etc.).

**Objective:** To assess the knowledge level about hand hygiene for all the physicians working at King Fahad Hospital of University, Dammam, KSA, and to check the availability of nonhuman resources for hand hygiene.

**Materials and Methods:** A cross-sectional design was used with a convenience sample including 209 physicians. Knowledge level was measured by the World Health Organization questionnaire.

**Result:** It was found that 15% of the physicians possessed good knowledge and 68% fair knowledge about hand hygiene. The defect in their knowledge was about the minimal time needed for alcohol-based hand rubbing to kill most of the hand germs. All nonhuman resources for hand hygiene were available, except for the lotions or creams that are used for lubrication to prevent dryness after hand hygiene.

**Conclusion:** Compliance with hand hygiene is the simplest and the most valuable method of infection control in hospitals. Physicians had an approximately good knowledge but they are lacking some necessary information, which can be enhanced by educational programs.


**KEY WORDS:** Hand hygiene, knowledge, physicians, Saudi Arabia

## Introduction

It is estimated that there are about hundreds of millions of patients with healthcare-associated infections (HAIs) worldwide annually. HAIs result in extra deaths, serious morbidity

and mortality, prolongation of hospital stay, unnecessary laboratory investigations, and healthcare costs.<sup>[1]</sup> Approximately 5 million cases of HAIs occur each year in Europe, contributing to 135,000 additional deaths, and excess healthcare costs of €13–24 billion.<sup>[2]</sup> Moreover, this added 18–24 days to the length of the hospital stay.<sup>[3]</sup> In the United States, approximately 2 million patients become victims of HAIs each year. These infections resulted in 99,000 preventable deaths, with costs estimated as high as \$5.7 billion.<sup>[4]</sup>

The majority of HAIs transmit through the hands of healthcare providers (HCPs). Hand hygiene in the healthcare setting is considered the easiest and the most effective infection control measure in the prevention of HAIs by

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the Centers for Disease Control and Prevention (CDC). Different studies showed that, when the compliance to hand hygiene increased, the number of cross infections decreased. Some of these studies revealed a reduction rate by 60%.<sup>[5]</sup> Moreover, when interventional programs were implemented to improve hand hygiene compliance, it increased by 13%.<sup>[5]</sup> Therefore, compliance with hand hygiene is the simplest and the most valuable method of infection control in hospitals.

The overall compliance among healthcare workers (HCWs) is low; the average compliance is 38.7%.<sup>[6,7]</sup> Different studies<sup>[8-10]</sup> showed that: (a) physicians are less compliant than the registered nurses regarding hand hygiene, and (b) all healthcare professional groups demonstrated a sustained improvement in hand hygiene compliance except medical staffs.

Studies have reported that the hand hygiene practices of HCWs might be affected by workload "being busy," stress, and the physical environment, including the availability and location of sinks.<sup>[11,12]</sup> However, it has also been suggested that poor hand hygiene compliance is related to bad habits and can be controlled with the combination of education and training.<sup>[11-13]</sup>

In a recent survey of attitudes toward hand hygiene, physicians reported "remembering to perform hand hygiene" and "high workload or feeling too rushed" as their top barriers to hand hygiene compliance.<sup>[14]</sup> A study surveyed a variety of HCWs including physicians and found environmental barriers to hand hygiene compliance to be dominant, including lack of soap, broken soap dispensers, and lack of paper towels.<sup>[14]</sup> Educational gaps in infection control training among physicians also existed. Strategies effective for improving infection control practices of HCWs presented a significantly less impact on physicians.<sup>[14]</sup>

The purposes of this study were to: (a) assess the level of King Fahad Hospital of University (KFHU) physicians' knowledge about the importance of hand hygiene, (b) investigate the factors affecting the knowledge of physicians about hand hygiene, and (c) check the availability of nonhuman resources for hand hygiene in KFHU.

## Materials and Methods

### Design, Setting, and Sample

A cross-sectional study was conducted in KFHU in Eastern Province, KSA. A convenience sample of all the 62 specialists, 86 residents, and 61 interns working in all the clinical departments of KFHU during the research period 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 is KFHU-EXEM 0038. All the participants signed an informed consent before data collection. Participation was voluntary.

The researcher informed the 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 were kept in a secure place of storage only accessible by the researcher.

## Data Collection Instruments

### *Knowledge and Perception Survey for Health-Care Workers Questionnaire*

All the physicians answered a self-report questionnaire about their knowledge regarding the importance of hand hygiene. The questionnaire was based on the Knowledge and Perception Survey for HCWs of the WHO, 2009.<sup>[7,15]</sup> It included a total of 34 questions distributed as follows: seven demographic data questions, three questions about previous formal training in hand hygiene, 10 questions about cross-transmission and its prevention, and 14 questions about hand hygiene procedure.

### *Assessing Availability of Resources of Hand Hygiene*

A checklist was developed to assess the availability of resources of hand hygiene in all the departments of KFHU (outpatients and inpatients clinics). The availability of nonhuman resources included: running water and alcohol-based hand rub in each clinic and ward, and the types of alcohol-based hand rub used. The place of these resources should be safe and kept out of reach of children. In addition to these necessary resources, the availability of creams and disposable gloves in each department was also assessed, because this is a recommendation from the WHO to prevent hand dryness.

## Data Analysis

All the data were analyzed using Statistical Package for the Social Sciences (SPSS, Inc., Chicago, IL; version 20). The number and the percentage of the physicians who got the correct and incorrect answers were reported to assess the knowledge level. The  $\chi^2$ -test was used to check if there is a significant difference between the two groups (who answered correctly and incorrectly). Knowledge scores were categorized as poor knowledge if the score was less than 60% of maximum (0–14), fair knowledge if the score was between 61% and 80% of maximum (15–19), and good knowledge if the score was above 80% of maximum (20–24).

T-test and one-way ANOVA were performed to test the differences between/among the mean knowledge scores of hand hygiene of KFHU physicians by professional data. Alpha was set at level of 0.05 a priori.

## Result

The total knowledge scores were calculated. The maximum knowledge score was 24. Fifteen percent of physicians possessed good knowledge about hand hygiene,

**Table 1:** Knowledge of KFUH physicians about hand hygiene by training

Knowledge questions	Correct answer by training, (n = 209)		Total, number (%)	$\chi^2$
	Yes (n = 105), number (%)	No (n = 104), number (%)		
Route of cross-transmission of potentially harmful germs between patients in a healthcare facility	78 (74.3)	75 (72.1)	153 (73.2)	0.723
Source of germs responsible for healthcare-associated infections	60 (57.1)	61 (58.7)	121 (57.9)	0.825
Hand hygiene before touching a patient prevents transmission of germs	103 (98.1)	101 (97.1)	204 (97.6)	0.643
Hand hygiene immediately after a risk of body fluid exposure prevents transmission of germs	84 (80.0)	92 (88.5)	176 (84.2)	0.093
Hand hygiene after exposure to the immediate surroundings of a patient prevents transmission of germs	79 (75.2)	85 (81.7)	164 (78.5)	0.254
Hand hygiene immediately before a clean/aseptic procedure prevents transmission of germs	85 (81.0)	85 (81.7)	170 (81.3)	0.885
Minimal time needed for alcohol-based hand rub to kill most germs	37 (35.2)	26 (25.0)	63 (30.1)	0.107
Hand hygiene after touching a patient prevents transmission of germs to the healthcare worker	100 (95.2)	100 (96.2)	200 (95.7)	0.744
Hand hygiene immediately after a risk of body fluid exposure prevents transmission of germs to the healthcare worker	87 (82.9)	93 (89.4)	180 (86.1)	0.170
Hand hygiene immediately before a clean/aseptic procedure prevents transmission of germs to the healthcare worker	73 (69.5)	72 (69.2)	145 (69.4)	0.963
Hand hygiene after exposure to the immediate surroundings of a patient prevents transmission of germs to the healthcare worker	84 (80.0)	85 (81.7)	169 (80.9)	0.750
Hand rubbing is more rapid for hand cleansing than hand washing	68 (64.8)	69 (66.3)	137 (65.9)	0.810
Hand rubbing causes skin dryness more than hand washing	55 (52.4)	47 (45.2)	102 (48.8)	0.299
Hand rubbing is more effective against germs than hand washing	65 (61.9)	61 (58.7)	126 (60.3)	0.631
Which type of hand hygiene method is required before palpation of the abdomen?	65 (61.9)	63 (60.6)	128 (61.2)	0.844
Which type of hand hygiene method is required before giving an injection?	47 (44.8)	53 (51.0)	100 (47.8)	0.370
Which type of hand hygiene method is required after emptying a bedpan	30 (28.6)	34 (32.7)	64 (30.6)	0.518
Which type of hand hygiene method is required after removing examination gloves?	34 (32.4)	39 (37.5)	73 (34.9)	0.438
Which type of hand hygiene method is required after visible exposure to blood?	70 (66.7)	74 (71.2)	144 (68.9)	0.484

68% fair knowledge, and 17% poor knowledge. Moreover, no significant difference in the knowledge of physicians by training could be detected. According to Table 1, only about one-third of physicians gave the correct answer about the minimal time needed for alcohol-based hand rub to kill most germs and the hand hygiene method required after emptying a bedpan or after removing examination gloves. Moreover, about one-fifth of the physicians gave correct answers about the average percentage of hospitalized patients who will develop an HAI.

Table 2 revealed that no significant difference in a physician's knowledge score by gender, profession, formal training in hand hygiene, medical specialty, or routine use of alcohol-based hand rub for hand hygiene was detected. The most common reported incorrect answers were as follows: more than one-third of the physicians considered 10 s as the enough time for alcohol-based hand rubbing; and about two-thirds of the physicians considered hand washing the required method for hand hygiene after removing hand gloves and emptying bedpans.

All nonhuman resources for hand hygiene were available and correctly placed. A specialized trained employee was assigned to refill the empty bottles. The only nonavailable item for hand hygiene was the skincare products such as creams or hand lotions. These items were not available in all the departments.

## Discussion

This study showed that the majority of the KFHU physicians possessed good to fair knowledge about hand hygiene (83%). It was also interesting to note that, although hand rub was satisfactorily available, the physicians were not aware of the situations where hand rubbing can be used instead of hand washing. Hand washing takes up to 1 min and requires a sink with running water and soap/antiseptic, while hand rubbing takes only 20 s.<sup>[16]</sup>

Only 30% of physicians knew that the time needed for alcohol-based hand rubbing is 20 s to kill most germs of their

**Table 2:** Mean knowledge score of hand hygiene of KFUH physicians by professional data

Professional data	Physicians knowledge score (n = 209)			
	N	Mean	SD	P value
Gender				
Male	116	16.53	2.88	0.220
Female	93	16.80	2.53	
Profession				
Specialist	62	16.77	2.76	0.737
Resident	86	16.73	2.67	
Intern	61	16.42	2.80	
Training in hand hygiene				
Yes	105	16.69	2.86	0.207
No	104	16.61	2.60	
Medical specialty				
Major <sup>a</sup>	72	16.56	2.60	0.307
Minor <sup>b</sup>	137	16.70	2.80	
Using of an alcohol-based hand rub				
Yes	187	16.66	2.76	0.797
No	22	16.59	2.50	

<sup>a</sup>Major specialty includes Internal Medicine, General Surgery, Pediatric, and Obstetrics and Gynecology.

<sup>b</sup>Minor specialty includes Cardiology, Nephrology, Neurology, Dermatology, Psychiatry, Plastic Surgery, Cardiothoracic Surgery, Vascular Surgery, Pediatric Surgery, Urology, Orthopedic, Family medicine, ENT, Ophthalmology, and Neurosurgery.

hands, as recommended by the WHO. This study has shown that HCPs tend to wash their hands more often after contact with patients than before contact and after emptying a bedpan or removing examination gloves. The WHO guidelines for hand hygiene 2009, recommend using alcohol-based hand rub before and after contact with every patient, after giving an injection, after emptying a bedpan, and after removing examination gloves. Hand washing was recommended only after a visible exposure to blood or body fluids or using toilettes.<sup>[6]</sup> This might explain the low compliance rates of hand hygiene among physicians. Moreover, this study showed that skincare products were not available in all the departments, and this might explain the lack of compliance owing to dryness of the hand after hygiene.

It is also noteworthy that there was no difference among all specialties regarding the knowledge, which means that all these specialties have approximately the same level of knowledge. So, if an educational program is implemented to enhance the knowledge and improve the compliance, it should include all these specialties.

## Conclusion

Hospital-acquired infection through the hands of HCWs is mostly because of poor hand hygiene of the HCPs. Therefore, compliance with hand hygiene is the simplest and the

most valuable method of infection control 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. In this study, physicians had an approximately good knowledge, but they are lacking some necessary information that might enhance hand hygiene compliance. An educational program involving all the physicians at the KFHU might be necessary to enhance hand hygiene. It is also recommended to display posters of hand hygiene technique and the duration of the entire procedure using alcohol-based hand rub and to provide skincare products such as cream or hand lotion in all the healthcare settings.

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