

Perspective of Health Care Professionals in Two Teaching Hospitals Regarding Hand Hygiene

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Abstract

Background: Adherence to hand hygiene (HH) by health care professional (HCP) is crucial to prevent nosocomial infections; adequate knowledge and a positive attitude are needed for optimal compliance.

Objectives: The current study aimed to assess the knowledge and the attitudes of the HCPs regarding HH.

Materials and Methods: Questionnaires were distributed to HCPs in two university affiliated hospitals. After completion, members of the study team analyzed the collected data.

Results: Two-hundred fifty-five personnel completed the questionnaires; 143 (56.1%) physicians and 112 (43.9%) nursing personnel. Hands of health care personnel were named as the major source of transmission of infection and hand washing as the most effective way to prevent transmission by 88.6% and 94.5% of participants respectively. Hand washing was recognized as HH by 81.6% of the HCP, alcohol hand rubs by 64.3% and disposable gloves by 23.9%. Reasons to perform HH included prevention of nosocomial infection by 85.1% along with self-protection by 64.3%; 25.9% had received formal training. Lack of knowledge, poor accessibility to alcohol hand rubs and concerns about skin damage were regarded as barriers to HH by 71.4%, 54.1% and 41.2% of participants, respectively. Suggestions for improving compliance to hand hygiene: continued education, 67.1%; increasing number/accessibility to hand rubs, 63.5%; putting up posters 54.5% and camera control, 15.7%.

Conclusions: The findings indicate that hand hygiene should be included in the formal curriculum, continuous education and supervision are necessary to ensure compliance.

Keywords: Hand Hygiene, Nosocomial Infection, Health Care, Hand Washing, Alcohol Hand Rub, Hospital

1. Background

Hands of health care personnel constitute the most important source for transmission of infection in health care settings. Since the mid-nineteenth century, when Semmelweis observed that patient mortality rates could be reduced in hospitals by washing hands with an antiseptic solution before touching the patients, hand hygiene practice by health care professionals is recognized as the single most important factor in reducing health care associated infections (HCAI) (1).

The rate of HCAI and hand hygiene (HH) practices varies widely in the developed and developing countries, which depends not only on the availability of proper equipment but also on the awareness and attitude of the health care professionals (1). However, in poor resource settings, even if the health care professionals possess the necessary know-how about implementation of hand hygiene, lack of adequate facilities for hand cleansing would affect their outlook and practice. Other factors that could adversely affect HH compliance

include lack of time due to understaffing, irritation of skin by repeated hand washing and lack of role model or accountability (2, 3).

2. Objectives

Since adequate knowledge and the right attitude are important pre-requisites for proper implementation of HH, the current study was carried out to assess the knowledge and the attitudes of the HCP working in two university affiliated hospitals, a general teaching hospital and a tertiary care children's hospital, in Tehran, Iran.

3. Materials and Methods

Pre-designed questionnaires were distributed in two teaching hospitals affiliated with the Shahid Beheshti university of medical sciences in Tehran to assess the knowledge and attitudes of the HCP working in these institutions. One of the hospitals, (hospital A), is a tertiary-

care children's hospital and the other one, (hospital B), deals with several sub-specialties, mainly admits adult patients, but also has a level III neonatal intensive care unit, (NICU) for newborns both from in-hospital deliveries and also neonates delivered outside this center. The questionnaire was designed in accordance with observations of previous studies (1, 3, 4).

Particulars of the HCP including occupation, (physician or nursing staff), age, gender, and place of work, (hospital A or B) were recorded. HCP's knowledge was tested on the following items:

1. Major routes of infection spread: patients', HCP's, or visitors' hands or dress.

2. Spread of infection through equipment used for physical examination: stethoscopes, blood pressure apparatus.

3. Methods of preventing nosocomial infections

4. Actions considered as hand hygiene by the HCPs.

5. The necessity of hand hygiene performance before putting on gloves.

6. Necessity of performing hand hygiene before/after low-risk contact with patients; i.e., contacts with no risk of exposure to body fluids.

7. Probability of skin-damage through routine hand hygiene practices.

8. Effect of artificial nails, long-sleeved dresses, rings, and moisturizing creams on contamination of hands.

HCP attitude and beliefs were tested on the following items:

1. Their reasons for performing HH, i.e., this question included the following items:

- A: To avoid getting infected

- B: To prevent nosocomial infections

- C: To help cleanliness

- D: Habit acquired since childhood

- F: Received training

- G: Providing a role model for patients

2. Their view point about the low rate of compliance with HH among HCPs, incorporated the following:

- A: Lack of knowledge regarding the spread of nosocomial Infections

- B: Lack of time

- C: Concerns about skin damage by repeated hand washing

- D: No easy access to alcohol hand rubs

- E: Non-compliance with hand hygiene by superiors

- F: Non-compliance with HH by colleagues

- G: No supervision

- E: No objection by patients

- F: Other reasons

3. Their idea about strategies that would increase the rate of adherence to hand hygiene. This item incorporated five options: increasing the number of alcohol hand rub dispensers, camera control, posters, continuous medical education, and/or any other strategies.

After completion, the questionnaires were collected by members of the study team. All data were documented and analyzed. SPSS version 16 was employed for analysis,

frequencies were derived as percentage and comparison between physicians and non-medical staff was done by the Chi square test. P-values < 0.05 were considered significant.

4. Results

Two-hundred and fifty-five personnel answered the questionnaire, 133 from hospital A, (children's hospital) and 122 from hospital B; 143, (56.1%) were from the medical staff and 112, (43.9%) were nursing personnel. Among the medical staff 37 individuals, (14.5% of total participants and 25.9% of the medical staff) were specialists, attending physicians and fellows, while the rest were the house staff, residents and interns. From the participants, 50 (19.6%) males, 173 (67.8%) females, and 32 (12.5%) had not mentioned their gender. Most participants, 128 individuals, 50.2%, were aged between 20 - 29 years and only 8 (3.1%) were > 50 years old. Basic characteristics of the personnel between the two hospitals were comparable, except that significantly more participants from hospital B were in the younger age category, (P = 0.018), Table 1.

Knowledge and beliefs of HCP about HH is depicted in Table 2.

There were significant differences between physicians and the nursing personnel in the following variables from the five main items (Table 3).

- 1) Major sources of nosocomial infection:

1. Affirmative answers were as follows: 4.5% of nurses and 16.1% of physicians included the health professionals' dress; 92% of nurses and 80.4% of physicians included patient examination equipment, (P values = 0.004, and 0.022, respectively).

2. Most effective practices to control nosocomial infection: hand washing was considered the most effective method in preventing nosocomial infection by 99% of nurses and 91% of physicians (P value = 0.004).

3. Practices incorporated in the term HH: use of disposable gloves was marked by 15.1% of nurses and more than 31% of physicians; while hand washing was considered as HH by 76.4% of nurses and 88.8% of the medical staff, (P values = 0.003 and 0.001, respectively).

4. The necessity of hand hygiene performance before putting on gloves: 68.5% of nurses and about 48% of physicians doctors answered in affirmative (P value = 0.009).

5. Practices that undermine HH: 21.6% of nurses and 37% of physicians listed the use of hand moisturizers (P value = 0.018).

There were no significant differences between the attitudes of nurses and physicians regarding the implementation of HH, except that 49.1% of nurses and 32.2% of physicians believed that concerns about skin damage was a major factor in non-compliance with HH (P value = 0.006) (Table 4).

Table 1. Basic Characteristics of the Participants in the Two Hospitals^a

Variable	Hospital A	Hospital B	Total Number
Gender, female	91 (35.6)	82 (32.1)	173 (67.8)
Occupation, nursing staff	59 (23.1)	53 (20.8)	112 (43.9)
Medical staff hierarchy	74 (29)	69 (27)	143 (56.1)
Age category, y			
20 -29	54 (42.5)	74 (61.7)	128 (51.8)
30 -39	42 (33.1)	25 (20.8)	67 (27.1)
40 -49	25 (19.7)	19 (15.8)	44 (17.8)
> 50	6 (4.7)	2 (1.7)	8 (3.1)
Age not specified	4	4	8 (3.1)

^aData are presented as No. (%).**Table 2.** Knowledge and Beliefs of Participants About Hand Hygiene^a

Variable	Participants' Answers (n = 255)
What are the major sources of nosocomial infection?	
HCPs' hands	88.6
Patients' hands	10.2
Equipment	85.5
What is the most effective way to decrease NI	
Disposable gloves	35.7
Hand washing	94.5
Hand hygiene includes	
Alcohol hand rubs	66.3
Hand washing	81.6
Alcohol hand rub damages skin	48.6
Necessity for hand hygiene before low risk contact	83.9
Necessity for hand hygiene after low risk contact	87.8
What is your reason for performing hand hygiene	
Self-protection	64.3
Prevention of nosocomial infection	85.1
Received training	25.9
Causes of non-compliance with hand hygiene in health personnel	
Lack of knowledge about transmission of infection	71.4
Lack of time	54.1
Concerns about damaging skin	39.2
Poor accessibility to alcohol hand rubs	41.2
Non-compliance by superiors	27.5
Non-compliance by colleagues	25.9
No supervision	33.7
No objection from patients	17.3

^aData are presented as percent.

Table 3. Comparison of Knowledge about Hand Hygiene Between Physicians and Nursing Staff^a

Variable	Nursing Staff (n = 112)	Physicians (n = 143)	P Value
What are the major sources of nosocomial infections			
HPs' dress	4.5	16.1	0.004
HPs' hands	90	88.8	0.761
Patients' hands	7.3	12.6	0.168
Visitors	6.4	11.2	0.186
Equipment	92	80.4	0.022
What is the Most effective way to decrease NI			
Gowns	16.2	19.6	0.490
Disposable gloves	33.3	37.8	0.465
Hand washing	99.1	91.6	0.007
Hand Hygiene includes			
Alcohol hand rubs	68.9	67.1	0.77
Disposable gloves	15.1	31.5	0.003
Hand washing	76.4	88.8	0.009
Necessity for hand hygiene before putting on gloves	68.5	47.9	0.001
Alcohol hand rub damages skin	46.8	50.7	0.137
Necessity for hand hygiene before low risk contact	89.2	80.4	0.129
Necessity for hand hygiene after low risk contact	91.9	85.3	

^aData are presented as percent.**Table 4.** Comparison of Beliefs and Attitudes Towards Hand Hygiene Between Physicians and Nursing Staff^a

Variable	Nursing Staff (n = 112)	Physicians (n = 143)	P Value
Reasons for performing hand hygiene			
Self-protection	71.2	59.9	0.062
Prevention of nosocomial infection	84.7	86.6	0.662
For cleanliness	27.0	16.9	0.051
Habit acquired since childhood	8.1	11.3	0.403
Received training	31.5	21.8	0.081
To be a role model	19.8	16.9	0.574
Causes of non-compliance with hand hygiene in health personnel			
Lack of knowledge about transmission of infection	67.3	75.5	0.148
Lack of time	58.2	51.7	0.308
Concerns about damaging skin	49.1	32.2	0.006
Poor accessibility to alcohol hand rubs	40.9	42.0	0.867
Non-compliance by superiors	22.7	31.5	0.123
Non-compliance by colleagues	26.4	25.9	0.930
No supervision	36.4	32.2	0.485
No objection from patients	15.5	18.9	0.476

^aData are presented as percent.

5. Discussion

The current study findings regarding the knowledge, beliefs and attitudes of health care professionals working in two teaching hospitals in the capital city of a transitional country are noteworthy.

Most participants, almost 90%, recognized HCP's hands as the major source of transmission of nosocomial infection and approximately 95% stated that hand washing is the most effective way to prevent transmission of infection. Other studies have also quoted very high figures about the knowledge of health care workers regarding the importance of HH to prevent nosocomial infections (4-8). In a study from Shiraz, Iran which tested the knowledge and attitudes of the nursing staff about HH, 65.5% of respondents gave correct answers to all questions regarding knowledge items (9).

In another study about 99% of health care workers believed patient HH to be a key factor in prevention of infections (10).

A sizeable proportion of participants, >35%, believed that putting on disposable gloves would suffice for preventing nosocomial infections. Gloves are effective in preventing contamination of HCP's hands and indicated in situations when a health worker is at risk for coming in contact with patients' blood or body fluids, mucous membranes or non-intact skin, but glove use does not replace the need for HH in situations when the latter is indicated. Also it is crucial that hands must be washed after gloves are removed. Inappropriate and universal glove use results in waste of resources; it may actually increase the risks for transmission of infection as the health worker moves from a contaminated site to a clean site between patients or even on the same patient without changing the gloves (1).

Although most participants knew that hand washing was accepted as HH but approximately one third of the participants did not know that HH includes using alcohol hand rubs. Moreover, 24% of the HCPs in the current study accepted the use of disposable gloves as HH. The world health organization defines HH as "a general term referring to any action of hand cleansing that includes washing hands with water and soap or a soap solution, (either non-antimicrobial or antimicrobial) or applying a waterless antimicrobial hand rub to the surface of the hands (e.g., alcohol-based hand rub)" (1). Standard protocols about HH recommend that hand washing is necessary if the hands are visibly dirty or when dealing with patients having *Clostridium difficile* diarrhea; in all other situations requiring HH, the use of alcohol hand rubs is sufficient, or even more effective than hand washing for killing various pathogens including bacteria, viruses and fungi (1, 2).

Almost half of the participants were concerned that alcohol hand rubs harm the skin. A study conducted in Norway and Denmark revealed that 20% of participants in Norway and 15% in Denmark believed that HH agents were detrimental to the skin, while 5% and 6%, respectively believed that bacteria in the skin were harmless (3). Skin irritation by

HH agents is cited as a deterrent for non-compliance or infrequent compliance with HH in other studies as well (11,12).

When asked about their reasons for HH performance, most respondents in the present study gave self-protection and prevention of nosocomial infections as the two major reasons for compliance with HH but only 25% of participants had received formal training in HH performance. In an online survey, the nursing staff were asked for their reason for hand washing; the top answers were because they believed that hand washing prevents spread of infection and because they had been taught to adhere to hand washing (13). In another study although more than 40% of health care workers had not received formal training regarding HH, but most had been regularly exposed to posters in their work place (10).

Lack of knowledge was considered as the most common reason for non-compliance with HH by the personnel participating in the present study; other barriers included: lack of time, poor accessibility to alcohol hand rubs, concerns about harming skin, no supervision, non-compliance by superiors and/or colleagues, and no objection from patients, in descending order. Other studies quoted preference for gloves use, being too busy, or because frequent HH is damaging to the skin (10, 11).

Most health care workers in the studied hospitals believed that continuous education and increased accessibility to alcohol hand rubs would increase the compliance; while very few were in favor of camera control for direct observation.

Generally, researchers acknowledge that improving compliance to HH is a complex issue; despite the fact that most HCPs possess the required knowledge and a positive attitude, compliance with standard HH protocols remains low in most countries (6, 9, 11, 14, 15). A study in France noted that continuous education, poster reminders, and compliance by a senior health care worker who served as a role model had a positive effect on overall adherence to HH by the nursing staff (16).

Findings of the current study highlight some significant aspects regarding HH in HCPs working in two teaching hospitals: most HCPs knew that HH is important in preventing nosocomial infections, but less than half had received formal training; it is probable that the lack of formal teaching prompted a sizeable number to emphasize on lack of knowledge as the prime factor for non-observance of HH. It seems that education and training in hand hygiene (with an emphasis on the utility of alcohol hand rubs), in addition to repeated reminders in the form of thought-provoking posters and providing easy access to alcohol hand rubs would result in a favorable environment to promote compliance with HH by HCPs.

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Footnote

Authors' Contribution: Fatimeh Ghotbi and Shahnaz Armin organized data collection, helped in preparation and revision of the manuscript, and performed a critical review. Maryam Vakili performed data collection, organized the questionnaire, and helped in implementation of the research. Farideh Shiva designed the research project, wrote the manuscript.

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