

The Effect of Training in Promotion of Hand Hygiene in Hospital

Ali Majidpour¹, Sayyed Gholamreza Fanaei², Mohamad Hussein Behzad Moghadam², Ehteram Ahmadi², Najmeh Gazvini², Marjan Daneshvar Tehrani², Abolfazl Adhami², Somayeh Soleymanzadeh Moghadam^{1*}

¹ Antimicrobial Resistance Research Center, Iran University of Medical Sciences, Tehran, Iran ² Infection Control Committee of Erfan Hospital, Tehran, Iran

Abstract

Background and Objectives: Hand Hygiene (HH) is crucial for preventing infectious complications in health care settings. Informing the healthcare workers on the recommended hand washing method can promote this practice in the clinical staff. This study aimed to evaluate the impact of training the WHO-recommended five-moment hand washing method in promoting hand hygiene HH in a health care setting.

Methods: Ninety-eight clinical staff of Erfan Hospital participated in a training course. After training, the frequency of hand washing by the participants was compared with that before training. Chi-square test was used for examining the significance of the difference.

Findings: A significantly increased frequency of hand-washing was observed in the clinical staff after the training course ($P < 0.05$).

Conclusions: This study emphasizes the importance and effectiveness of training in controlling factors contributing to provenance of nosocomial infections.

Keywords: Hand hygiene, Hand washing, Nosocomial infections

Background and Objectives

Skin is the largest organ in the body, defends against the external world, and is an active immunological member [1, 2]. Skin and particularly hands are the source of many pathogenic organisms and can transfer them to both the patients and health care workers [3]. Presence of microorganisms on the hands of hospital workers causes nosocomial infection (NI) that is a worldwide problem [4]. This infection is among the main reasons for mortality and morbidity in patients in all countries, either developed or developing [5, 6]. Health-care infections cause 80,000 deaths annually

in the United States and 5,000 deaths in England [7]. Because of the growth in multi-drug resistance (MDR) microbial agents, HH is one of the most important factors for preventing NI [7]. So, paying attention to HH and disinfection in hospitals will lead to NI reduction and control [8-10]. Studies have shown that 40% of NI is transmitted by the hands of HCWs; however, this rate can be reduced by employing correct methods of hand washing [11]. Although many studies have demonstrated the importance of hand washing, in reducing health care associated infections (HCAI) in many countries, enough attention has not been paid to this issue [11-13]. Numerous works have represented that implementation of training programs can be effective for NI prevention and control. Therefore, the aim of this study was to compare hand washing among the hospital staff (physicians, nurses, and nurse auxiliaries) before and after training.

*Corresponding author: Somayeh Soleymanzadeh Moghadam, Antimicrobial Resistance Research Center, Iran University of Medical Sciences, Tehran, Iran, Tel: +98 9128163651, Email: so.soleymanzadeh@yahoo.com

Methods

This study was designed to compare the HCWs' hand washing before and after a 3-month training course in Erfan Hospital, Tehran (Iran) in 2012. The research samples were from 12 units of the hospital including surgery, emergency, women's, internal medicine, neonatal intensive care unit (NICU), pediatrics, pediatric intensive care unit (PICU), post-intensive care unit (post-ICU), general intensive care unit (MICU), surgery intensive care unit (ICUs), coronary care unit (CCU), and cardiac surgery intensive care unit (CSICU). Also data were collected from the HCWs in the morning and evening shifts and during the week days (Saturday-Sunday, Monday-Tuesday, Wednesday-Thursday, and Friday-Holidays). Ninety-eight HCWs including physicians, nurses, and nurse auxiliaries participated in this study. Five moments of WHO's Hand Hygiene questionnaire was used to gather data including before touching a patient, before a procedure, after a procedure or body fluid exposure risk, after touching a patient, and after touching a patient's surroundings. The HCWs in this study were trained in a 3-month training course. The collected data were analyzed by the SPSS software (ver. 20) and inferential statistical tests including Chi-square ($p \leq 0.05$). Oral consent was received from all respondents, and the data were protected confidentially.

Results

The results showed that, 51(52%) out of the 98 respondents were nurses, 40(40.8%) were nurse auxiliaries, and 7(7.1%) were physicians. Number of reported hand washing sink in the hospital departments ranged from 1 to 4. Minimum and maximum numbers of full antibacterial solution dispenser were 4 and 12, respectively. Also 76.9% of the participants washed their hands with Decosept, 15.3% with Magnugel, and 7.8% with both. The findings represented that, before the training course, 6(6.1%) washed their hands before touching a patient, 28(28.8%) before a procedure, 53(54.1%) after a procedure or body fluid exposure risk, 39(39.4%) after touching a patient, and 18(18.2%) after touching a patient's surroundings; however, after the course, 21(21.8%), 43(43.8%), 92(93.8%), 58(59.4%), and 55(56.3%) were obtained, respectively.

The Chi-square test result showed that 6.1% of HCWs washed their hands before touching a patient before the training course, which increased to 21.8% after the training though the increase was not statistically significant ($P=0.06$)(Table 1).

Also the findings revealed that the rate of HH before a procedure was 28.8% before the training, which increased to 56.2% that was not a statistically significant difference ($P = 0.32$). After a procedure or body fluid exposure risk, the HH rate that was 54.1% had a significant increase to 93.8% after the training ($P < 0.05$). There were no significant differences between the before and after training phases in HH rate after touching a patient ($P = 0.08$) (Table 1).

After touching a patients' surroundings, the HCWs washed their hands by 18.2% and 56.3% before and after training, respectively, which was statistically significant ($P \leq 0.05$) (Table 1).

In this study, hand washing rate significantly increased considering occupation (nurse and nurse auxiliaries). Since physicians did not participate in the study after the training course, there were no data about them. The results shown in Table 2 include mean percentage of all 5 moments in each occupation. Hand washing in nurses was 33.7% before training, which was increased to 61.3% after training ($P < 0.05$). Among the nurse auxiliaries, hand washing rate was significantly different after the training ($P < 0.05$) (Table 2).

Results of Chi-square showed that the number of HCWs in the morning shift washing their hands before training had a significant increase compared to those after training ($P = 0.00$). Among the previously mentioned units, surgery, internal medicine, NICU, PICU, MICU, SICU, CCU, and CSICU participated in the study after the training course. The percent of participation of HCWs in hand washing (before and after training) in different units of the hospital was as follows: surgery (40%), internal medicine (50.8%), NICU (31.9%), PICU (47.6%), MICU (10%), SICU (24%), CCU (39%), and CSICU (74%). Also surgery and SICU had a more significant increase than the aforesaid units (before training compared to after training) in terms of hand washing ($P = 0.05$ and $P = 0.00$), respectively. In Wednesday-Thursday, the percent of staff's participation in hand washing was more than in the other days (42%).

Discussion

Health care centers are one of the important sites of MDR pathogens, which are transmitted by hands between patients and HCWs; this problem leads to the majority of NI. Considering the role of hands in transmission of pathogens, it is important to pay special attention to sanitation, disinfection and washing of hands among employees [11, 14-16]. Thus, there are many studies about the use of soap, water and alcohol in HH. Though

Table 1 Comparison of hand-washing among HCWs before and after training.

Moment	Before training		After training		Significance
	Yes N (Percent)	No N (Percent)	Yes N (Percent)	No N (Percent)	
Before touching a patient	6 (6.1%)	92 (93.9%)	21 (21.8%)	77 (78.2%)	0.06
Before a procedure	28 (28.8%)	70 (71.2%)	43 (43.8%)	55 (56.2%)	0.32
After a procedure (body fluid exposure risk)	53 (54.1%)	45 (45.9%)	92 (93.8%)	6 (6.2%)	< 0.05
After touching a patient	39 (39.4%)	59 (60.6%)	58 (59.4%)	40 (40.6%)	0.08
After touching a patient's surroundings	18 (18.2%)	80 (81.8%)	55 (56.3%)	43 (43.8%)	< 0.05

this issue is important in the prevention of nosocomial infections, it has not received enough attention [11, 17]. In this study, hand washing before and after training was studied among 98 participants of a private hospital in Iran. All HCWs, before and after training, had the highest participation in HH in moment-3 (after a procedure or body fluid exposure risk) and moment-4 (after touching a patient). In these two moments, percentage of participation was 93.8 and 59.4 after training, respectively. In a similar study conducted by Majidpour and Shari'at (2014), 95.4% of the trained HCWs washed their hands after contacting with blood [11]. Another study in 2012 in Ireland showed that the highest percentage was allocated to moments 3 and 4 [18]. The present research findings indicated that hospital workers paid less attention to washing their hands before touching a patient (6.1%); this rate was increased to (21.8%) after the training course. This study showed that training plays an effective role in improving sanitation among the staff. Also, in another study by Higgins and Hannan (2013), the important role of training was confirmed [19]. Comparing the contribution of hand washing among the staff before and after the training in the present study shows that the participation rate of nurses increased from 33.7% to 61.3% after training in all of the 5 moments; this increase was 27.3% to 51.4% among the nurse auxiliaries. The rate of hand washing among the physicians was 26.9% before

training; however, they did not participate after receiving the training. Given that physicians have adequate knowledge on the importance of hand washing and play an important role in the health of communities, it seems that they paid less attention to this issue [15]. In addition, our results showed that the nurses had more participation than other HCWs, and similar findings have been reported in this regard in Iran (a tertiary hospital) in 2013 and Ireland in 2012 (11,18). But, a Nigerian study (2006) that was done in some private, general, tertiary hospitals and other facilities revealed that doctors always washed their hands by almost 10% and 5% more than trained nurses and nurse auxiliaries, respectively [20]. The present study showed that hand washing was 40% ($P = 0.05$) in surgery unit and 24% in ICU ($P = 0.00$), whereas Samadipour *et al.* reported hand washing was 21.3% in surgery ward and 15.7% in ICU [21]. In the study by Majidpour and Shari'at in Iran (2014), hand washing rate was 50.77% in the Surgery Department [11]. It seems that the differences in the results of various studies indicate that training is essential for health-care personnel at all levels and hospital units.

The limitations of this study were that the samples were only selected from among nurses, nurse auxiliaries, physicians and other HCWs were not considered. Because of the lack of desire on the part of physicians to participate in hand washing, the number of

Table 2 Comparing hand washing based on occupation of HCWs before and after training

Occupation	Before training		After training		Significance
	Yes %	No %	Yes %	No %	
Nurse	33.7	66.3	61.3	38.7	< 0.05
Nurse auxiliaries	27.3	72.7	51.4	48.6	< 0.05

physicians in this study was low.

Conclusions

This study showed that training plays an important role in hand washing among HCWs and trained staff could contribute more effectively to the control of nosocomial infections. Furthermore, training course about HH should be done in all health care centers.

Competing Interests

The authors declare no competing interests.

Acknowledgments

The authors wish to thank all the HCWs and members of the Infection Control Committee who helped to do this study in Erfan Hospital.

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Please cite this article as:

Ali Majidpour, Sayyed Gholamreza Fanaei , Mohamad Hussein Behzad Moghadam, Ehteram Ahmadi, Najmeh Gazvini, Marjan Daneshvar Tehrani, Abolfazl Adhami, Somayeh Soleymanzadeh Moghadam. The Effect of Training in Promotion of Hand Hygiene in Hospital. *International Journal of Hospital Research* 2015, 4(1):43-46.