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Brief Original Article

Hand hygiene knowledge, perception and practice of healthcare workers in a Turkish university hospital intensive care unit

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Abstract

Introduction: While improvement of hand hygiene (HH) compliance is considered as the best approach to reduce healthcare-associated infections, the instructional interventions in HH among healthcare workers of intensive care unit (ICU) of our hospital was not successful enough. The following study was conducted to evaluate HH knowledge, perception, practice and effectiveness of the trainings among healthcare workers of ICU in our hospital.

Methodology: A cross-sectional study was conducted in the ICU containing 8 medical and 16 surgical beds with 284 filled questionnaires about HH knowledge and 1187 observed opportunities for HH compliance.

Results: Overall observed HH compliance rate was 40.6%; lowest compliance was 21.7% for "before clean/aseptic procedure" indication and highest compliance was 68.6% for "after touching a patient" indication. Although > 90% healthcare workers correctly identified the World Health Organization's five indications for HH, 82 – 85% failed to recognize non-indications, i.e. when it was not necessary to perform HH. Our study showed that 15.1% of healthcare workers neither received nor felt the need for HH training.

Conclusions: Despite regular HH trainings, healthcare workers could not differentiate when HH was not required which suggested failure to understand HH rationale. This may explain poor HH compliance rates. A systematic study is needed in order to find out the reasons behind of this noncompliance and improve HH training methods for educating healthcare workers.

Key words: Hand hygiene compliance; quantitative study; healthcare-associated infections; intensive care unit.

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Introduction

Health care-associated infections (HCAIs) cause considerable morbidity and mortality in developing countries, putting an extra restraint on already limited resources [1]. It is widely accepted that prevention of HCAIs can be achieved through complete and continual compliance with hand hygiene (HH) by health care workers (HCWs) [2].

Despite our training efforts in HH, cross-colonization and subsequent infections with multi-drug resistant pathogens have frequently been observed in our intensive care unit (ICU) indicating a deficiency in HH compliance [3,4].

Assessing institution- or unit-specific barriers to HH compliance is recommended for formulating interventions that would be locally relevant [5,6]. Therefore, we aimed to determine the level of HH knowledge, perception and practices of HCWs working in the ICU of Marmara University, Pendik Training and Research Hospital, Istanbul, Turkey in order to improve future HH interventions.

Methodology

A cross-sectional study was conducted in the ICU containing 8 medical and 16 surgical beds. This study was approved by the institutional clinical research ethics committee of Marmara University, School of Medicine (file no: 1300252382). The study used self-administered questionnaires and direct observation for data collection. A questionnaire based on the World Health Organization's (WHO) HH knowledge questionnaire was designed and pilot tested on five HCWs [7]. The questionnaire assessed sociodemographic characteristics, perception of HH compliance, previous HH trainings, perceived need for future training, and standard knowledge about HH and HH indications (Supplement). HH compliance of HCWs was evaluated through direct observation. The WHO's Five Moments (before touching a patient,

before performing clean/aseptic procedure, after body fluid exposure risk, after touching a patient, and after touching patient's surroundings) Observation Form was used for data collection [8].

A group of final year medical students (interns) doing their public health clerkship were recruited as data collectors and observers. In the first phase of the study, they distributed the questionnaires to HCWs in the ICU and collected them. For the second (observational) phase, medical students were trained by the infection control physician on how to observe HH compliance using the WHO training video, and 40 HH opportunities were observed along with the infection control physician until a coherence was reached [9]. HH observations were carried out for a week in the ICU, from 8:30 to 10:30, Monday to Friday.

Instead of choosing a sample, all HCWs in the ICU were observed (12 nurses, 8 environmental services personnel (ESP), 8 physicians in medical and 23 nurses, 10 ESP, 10 physicians in surgical site of ICU). The anonymous questionnaire was completed by all HCWs in the ICU together with internists, surgeons and anesthesiologists who have access to the ICU (284 HCWs, response rate of 92%).

Descriptive data were presented as medians, interquartile range (IQR) and percentages. Categorical variables were compared with the chi-square and Fisher's tests. A p value of < 0.05 was set as the level of statistical significance.

Results

Of 284 questionnaire respondents, 45.8% were female and the median age was 29 (9) years. Within the study group, 72.3% were physicians, 18.8% were nurses and 8.9% were ESP.

Compliance perception

Of 281 participants, 62 (22.1%) indicated that their compliance to HH guidelines were insufficient. Factors such as age, sex, years in occupation (i.e. experience), prior HH training or recent (within 1 year) HH training were not associated with insufficient compliance perception. Only occupation was a significant factor: while 27.2% of the physicians expressed insufficiency with HH compliance, this rate was 9.1% for non-physician HCWs ($p = 0.001$).

Perceived need for training

The proportion of HCWs who had received HH training was 76%. Of the participants, 68 (24.4%) currently felt the need for HH training. Among factors tested, prior HH training significantly lessened the perceived need for additional HH training (37.3% *vs*. 19.9%, $p = 0.004$) (Table 1). Of 278 participants, 42 (15.1%) did not feel the need for HH training although they had not received training before.

HH knowledge

Over 95% of HCWs correctly answered six out of eight questions about HH knowledge including glove usage, HH requirement between patients and relation between HH and HCAI development. The application durations required for hand disinfection with alcohol-based hand rub and soap/water were the least correctly answered questions with 45.9% and 33.5% of HCWs giving the correct answers, respectively.

Table 1. Factor associated with the perceived need for HH training*.

	Fells need for training	Does not feel need for training	p value
Age, years (median, IQR)	29.5 (10)	28 (7)	0.021
Sex			
Female	34 (26.8)	93 (73.2)	0.394
Male	34 (22.4)	118 (77.6)	
Occupation			
Physician	55 (27.2)	147 (72.8)	0.052
Non-physician HCW	12 (16)	63 (84)	
Years in occupation			
< 1	5 (27.8)	13 (72.2)	
≥ 1, < 5	24 (19.5)	99 (80.5)	0.12
≥ 5	30 (31.6)	65 (68.4)	
Prior HH training			
Yes	42 (19.9)	169 (80.1)	0.004
No	25 (37.3)	42 (62.7)	
Last training period			
< 1 year	20 (16.8)	99 (83.2)	0.186
≥ 1 year	22 (24.2)	69 (75.8)	

* Data are presented as n (%) unless otherwise noted.

HH indication knowledge

Of the participants, > 93% identified the WHO-recommended five HH indications correctly. However, non-indications such as performing HH in the corridor before entering or after exiting patient room, or performing HH before touching patient's surroundings were also marked as correct by > 82% of HCWs. Prior HH training was not a significant factor in discerning non-indications ($p > 0.05$).

HH compliance

Overall observed HH compliance rate was 40.6% (Figure 1A) with the lowest rate of 21.7% for "before clean/aseptic procedure" indication and the highest rate of 68.6% for "after touching a patient" indication (Figure 1B).

Discussion

Our hospital is located on the Asian side of Istanbul with 650 beds serving a population of about 5 million. As a tertiary-level university hospital, we receive many critically ill patients referred from nearby hospitals. The ICU with a total of 24 medical and surgical beds are usually at > 90% occupancy. Despite our training efforts, cross-colonization among patients continues. In this study, we wanted to take a snapshot of the ICU in terms of HH knowledge, perception and practice to plan our future interventions.

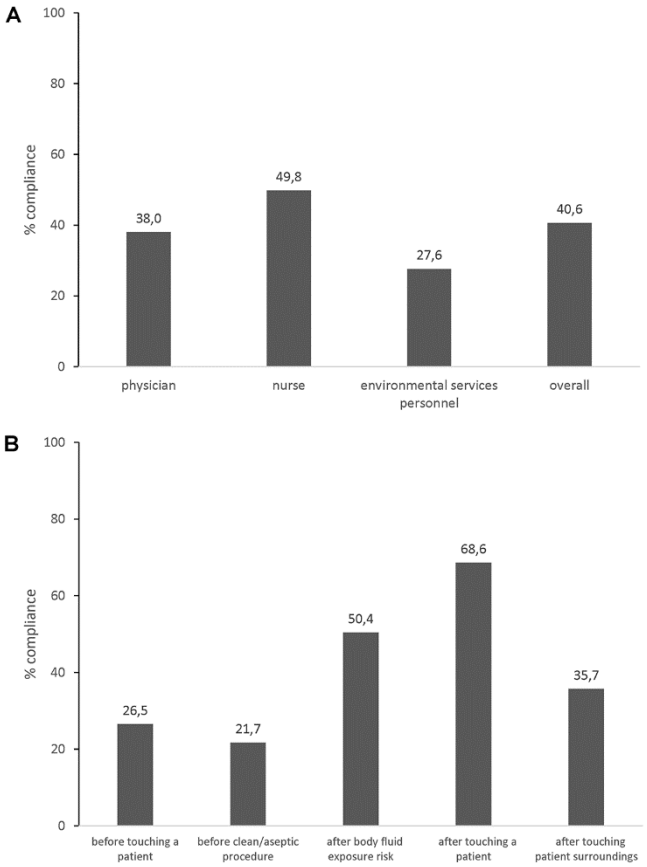
In terms of knowledge, the overwhelming majority appeared to understand the importance of HH in the acquisition of HCAIs. Of the participants, > 93% identified the WHO-recommended five HH indications correctly, but failed to identify the non-indications. This finding might suggest that HCWs answered the questions intuitively rather than knowingly. It is critical that HCWs should understand the rationale behind HH and discern non-indications as well as indications, as failure to do so might lead to the belief that there are too many indications and it is impossible to comply with all. Whether this assertion is true should be studied in a future research.

Our study showed that HCWs' perception of HH compliance is much higher than what was observed. In the questionnaire, most (77.9%) HCWs believed that they had sufficient HH compliance. However, the direct observation showed an overall 40.6% compliance, which might even be an overestimation as observations were made during morning hours while the staff were rested and more in number; and open to the Hawthorne effect [10]. Moreover, the compliance to the indication before clean/aseptic procedures was 21.7%, lowest of all the indications. This indication is especially important in the prevention of colonization and infection of medical devices such as intravascular catheters or ventilators [11]. These findings may adequately explain the cross-colonization and device-associated HCAIs observed in the ICU. These points should be stressed during training sessions [12].

The HH compliance rates of ICU in our center are reported by the charge nurse quarterly. Their last 12 HH compliance rates for physicians, nurses and ESPs were at a median (IQR) of 56.5% (15%), 75.5% (20.8%), and 55% (12.2%), respectively, with an overall compliance of 57.4% (25.1%). Our study also showed that such self-reporting could be inaccurate as this rate was higher than the directly observed 40.6% compliance rate [10].

Physicians were more likely to perceive themselves as non-compliant. Moreover, there was a group of HCWs, who were neither trained nor felt the need to be trained. More studies are needed to find out the reasons behind this lack of interest and how to arouse motivation in HH [13].

Figure 1. Hand hygiene compliance in intensive care unit determined by trained observers according to the WHO guidelines. a. occupational category-based compliance, b. indication-based compliance.



Conclusion

Our findings showed that the observed HH compliance was much lower than HCWs' perception and there was a major deficiency in understanding the rationale behind HH indications despite our training efforts. To explore the reasons for poor HH compliance we need to understand the beliefs and attitudes that shape HH behavior in our cultural setting [14,15]. A qualitative research has been planned and finalized to address these questions [16].

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Annex – Supplementary Items

Investigation of knowledge and perception of healthcare workers on hand hygiene

The most effective method to prevent healthcare-associated infections (e.g. hospital infections) is complete and continual implementation of hand hygiene during patient care. The aim of this questionnaire is to determine knowledge and perception of healthcare-workers about hand hygiene. As this questionnaire is anonymous, do not write your name. (total of 2 pages, 5 - 10 minutes to complete).

1. Age:

2. Sex:
   - ☐ Female
   - ☐ Male
3. Occupation
   - ☐ Professor
   - ☐ Associate professor
   - ☐ Assistant professor
   - ☐ Attending physician
   - ☐ Resident physician
   - ☐ Intern doctor
   - ☐ Nurse
   - ☐ Staff/ personnel
4. Years in occupation
   - ☐ less than 1 year (<1 year)
   - ☐ 1 to 5 years (≥1 - <5 years)
   - ☐ more than 5 years (≥5 years)
5. Have you ever had a training on hand hygiene?
   - ☐ Yes
   - ☐ No (proceed to 8th question)
   - ☐ Not sure (proceed to 8th question)
6. Where did you get the training on hand hygiene?
   - ☐ In current hospital (Marmara Univ. Pendik Education and Training Hospital)
   - ☐ In previous hospital/ institution
   - ☐ In school
   - ☐ Other (please indicate) ……
7. When was the last time you had training on hand hygiene?
   - ☐ In last month (<1 month)
   - ☐ Between last month and last year (≥1 - <1 year)
   - ☐ Between last year and last 5 years (≥1 year - <5 years)
   - ☐ Before last 5 years (≥5 years)
8. Do you think you are complying sufficiently with hand hygiene while working? **Yes**☐ **No**☐

If your answer is "no", will you please indicate the obstacles for hand hygiene below?

……

9. Do you feel the need for hand hygiene training? **Yes**☐ **No**☐

10. Please indicate as **T**rue or **F**alse for the sentences below about hand hygiene:
    a) Hand hygiene can be performed by rubbing hands with an alcohol-based antiseptic solution. **T**☐ **F**☐
    b) When hands are visibly soiled, hand hygiene should be performed with soap and water. **T**☐ **F**☐
    c) There is no need to perform hand hygiene if gloves will be worn. **T**☐ **F**☐
    d) There is no need to perform hand hygiene between patients if hands are not soiled. **T**☐ **F**☐
    e) There is no need to change gloves between patients if gloves are not soiled. **T**☐ **F**☐
    f) Suboptimal performance of hand hygiene is the main reason for the development of hospital infections and the spread of multi-resistant pathogens among patients. **T**☐ **F**☐

11. Which one of the following do you prefer to perform hand hygiene?

	Always	Sometimes	Rarely	Never
Rubbing with hand antiseptic:	☐	☐	☐	☐
Washing with soap and water:	☐	☐	☐	☐

12. What is the required duration for rubbing with alcohol-based hand antiseptic?
    ☐ 5– 10 s
    ☐ 20 – 30 s
    ☐ 40 – 60 s
    ☐ longer than 60s
13. What is the required duration for washing with soap and water?
    ☐ 5 – 10 s
    ☐ 20 – 30 s
    ☐ 40 – 60 s
    ☐ longer than 60s
14. Which one of the following are recommended by World Health Organization to perform hand hygiene during patient care? (<u>indicate as **Y**es or **N**o</u>)

a) In the hallway, before entering patient room **Y**☐ **N**☐
b) Right before patient contact **Y**☐ **N**☐
c) Before contact with patient surrounding (e.g. bedside table, food tray, monitor, etc.) **Y**☐ **N**☐
d) Before clean/ aseptic procedure (e.g. placing a nasal cannula, inserting a catheter, blood withdrawal, etc.) **Y**☐ **N**☐
e) After body fluid exposure risk **Y**☐ **N**☐
f) After patient contact **Y**☐ **N**☐
g) After contact with patient surrounding (e.g. bedside table, food tray, monitor, etc.) **Y**☐ **N**☐
h) In the hallway, after exiting patient room **Y**☐ **N**☐
i) Before putting on gloves **Y**☐ **N**☐
j) After taking off gloves **Y**☐ **N**☐

THANKS FOR COMPLETING THE SURVEY!