

Original Article

## A qualitative study of hand hygiene compliance among health care workers in intensive care units

Pinar Ay<sup>1</sup>, Ayse Gulsen Teker<sup>1</sup>, Seyhan Hidiroglu<sup>1</sup>, Pinar Tepe<sup>1</sup>, Aysen Surmen<sup>1</sup>, Uluhan Sili<sup>2</sup>, Volkan Korten<sup>2</sup>, Melda Karavus<sup>1</sup>

<sup>1</sup> Department of Public Health, School of Medicine, Marmara University, Istanbul, Turkey

<sup>2</sup> Department of Infectious Diseases and Clinical Microbiology, School of Medicine, Marmara University, Istanbul, Turkey

### Abstract

**Introduction:** Studies indicate that adherence to hand hygiene guidelines is at suboptimal levels. We aimed to explore the reasons for poor hand hygiene compliance.

**Methodology:** A qualitative study based on the Theory of Planned Behavior as a framework in explaining compliance, consisting four focus group discussions and six in-depth interviews.

**Results:** Participants mostly practiced hand hygiene depending on the sense of "dirtiness" and "cleanliness". Some of the participants indicated that on-job training delivered by the infection control team changed their perception of "emotionally" based hand hygiene to "indication" based. Direct observations and individual feedback on one-to-one basis were the core of this training. There was low social cohesiveness and a deep polarization between the professional groups that led one group accusing the other for not being compliant.

**Conclusions:** The infection control team should continue delivering one-to-one trainings based on observation and immediate feedback. But there is need to base this training model on a structured behavioral modification program and test its efficacy through a quasi-experimental design. Increasing social cohesiveness and transforming the blaming culture to a collaborative safety culture is also crucial to improve compliance. High workload, problems related to work-flow and turnover should be addressed.

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

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### Introduction

Health-care associated infections (HCAs) are an important cause of morbidity and mortality among hospitalized patients. World Health Organization estimates that at any given time, the proportion of patients acquiring at least one HCAI is 7% in developed and 10% in developing countries. The burden is even higher among patients in intensive care units (ICUs) [1,2]. While 30% of ICU patients in high-income countries are affected by HCAs, the rate is estimated as 2-3 folds higher in low and middle-income countries [1].

Hand hygiene (HH) either performed by washing hands with soap and water or using alcohol-based hand rubs is considered as the most important measure for infection prevention in health care settings. Still studies indicate that adherence to HH guidelines is at suboptimal levels. The median compliance to HH guidelines is estimated as 40% and it is lower in ICUs compared to the other settings [3].

Mostly nurses have better compliance compared to physicians. HH is practiced less before patient contact then after touching a patient suggesting self-protection as a motivating factor. Also work environment has an impact on HH practice; high workloads, unavailability of alcohol based hand rubs and lack of organizational support deteriorate compliance [3]. While these findings provide important clues for shaping intervention strategies, they are still insufficient in explaining behavioral determinants of HH. Qualitative research methods can provide a deeper understanding of behavior since they explore beliefs, attitudes, social environment and intention [4]. Hence these methods are being increasingly used in studying compliance to HH guidelines [5-21].

A recent study carried out through direct observation at ICUs in our teaching hospital revealed that the overall HH compliance was 40.6% (U. Sili, personal communication, March 10, 2016). This figure might even be an overestimation due to the Hawthorne

effect. Hence the aim of this study is to explore the reasons for poor HH compliance at ICUs in our teaching hospital. We use a qualitative approach and apply the Theory of Planned Behavior (TPB) as a framework in explaining compliance [22]. TPB indicates that intention predicts the perceived likelihood of performing a behavior. Three factors determine intention; (1) attitude towards behavior, (2) subjective norms and (3) perceived behavioral control. Attitude to HH is the overall evaluation of the behavior; it questions whether performing HH will lead to favorable or unfavorable outcomes. Social norms take into consideration whether other people in the social environment approve or disapprove HH practice. And perceived behavioral control is the perceived ease or difficulty of performing HH practice, so it highlights facilitators and barriers of performing the behavior. TPB indicates that beliefs are the antecedents of attitude, social norms and perceived behavioral control. Hence the model considers behavioral, normative and control beliefs as the core of intention leading to behavior [22].

## Methodology

### Design

This is a qualitative study carried out in a teaching hospital in Istanbul. The study protocol was developed through using the Qualitative Research Review Guidelines – RATS.

### Setting and Participants

Medical (8 beds) and Surgical ICUs (16 beds) were selected as the study area. Physicians (academic staff, attending physicians, residents, interns) and non-physicians (nurses, cleaning personnel) working in these two ICUs were recruited through convenient sampling.

Medical education lasts six years in Turkey. In the last year, medical students who are called as “interns” practice one year of clinical training in their university

hospital. After completing this year, the graduates have a full license to practice medicine.

### Data Collection

Data were collected from a total of 25 participants through four focus group discussions (FGDs) and six in-depth interviews (IDIs). FGDs were carried out with residents, interns and nurses. Each FGD constituted 4-7 health care workers (HCWs). IDIs were conducted with academic staff, attending physicians, nurse supervisor and cleaning personnel. Number of participants in FGDs and IDIs by profession is presented on Table 1. Two researchers, a moderator and an observer carried out the FGDs and IDIs. A semi-structured interview guide was developed consistent with the TPB framework in the light of the literature. All interviews were audio taped after obtaining the oral consent of the participants.

### Analysis

All interviews were transcribed verbatim. Data were evaluated through thematic content analysis. Three of the researchers identified key concepts and categories and developed a coding frame. The initial coding frame was revised through several readings of the transcripts. Lastly interviews were re-read separately by the three researchers and were coded with the final themes.

### Ethical Approval

This study was approved by the institutional clinical research ethics committee of Marmara University, School of Medicine (file no: 1400032758). All participants were included into the study after being informed and taking their oral consents.

All data were analyzed and presented anonymously.

## Results

The ages of the participants ranged from 23 to 45 with a median of 27 years. Among the 25 participants;

**Table 1.** Number of participants in focus group discussions (FGDs) and in-depth interviews (IDIs) by profession.

	Number of FGD/ IDIs	Total number of participants
<b>FGDs</b>		
Residents	1	7
Nurses	2	8
Interns	1	4
<b>IDIs</b>		
Academic staff	1	1
Attending physicians	2	2
Nurse supervisor	1	1
Cleaning personnel	2	2
<b>TOTAL</b>	<b>4 FGDs and 6 IDIs</b>	<b>25</b>

19 were university graduates, 4 were in the last year of university (interns) and 2 were high school graduates. The duration of work in ICUs ranged from 1 month to 12 years with a median of 10 months.

#### *Attitude towards behavior*

##### The role of HH in patient protection

Most of the HCWs indicated that poor HH practices were the major factor contributing to HAIs. However, some participants – although few in number - believed that poor HH had only a minor role in the development of infections when compared to the other control measures. These participants indicated that lack of physical resources, insufficiency of cleaning/disinfection of patient-care areas and transmission through the visitors were the principal factors leading to infections. Participants with this perception underestimated the impact of poor HH on infection development.

*“...okay, we’re washing hands but unavoidably sometimes we’re leaving it out. I don’t believe that HH is related to these infections actually; sometimes we admit a patient before the (previous) one is discharged, before the bed is properly cleaned. So, I don’t think that it’s all related to handwashing, HH, probably there is a link (between HH and infections), but not all infections are related to handwashing.*

*[What proportion of infections do you think are due to poor HH practices?]*

*“I say 20 percent”*

*Nurse, male*

Another factor attributed to the development of HAIs was defined as the lack of “leaving the patient bed or the patient room for rest.” This was brought up by a cleaning personnel and an intern. These participants believed that infections occurred because the patient bed or the patient room was not “left for rest”, meaning left vacant, at least one day after discharging the previous infected patient.

*“Let’s say that a patient is dead, don’t we need to rest (the bed) for 24 hours?... But now an infected patient dies and in half an hour another patient is admitted to that bed....Infection develops mostly because of beds. We cleaned the ICU and then an infected patient came and died, another one came to that bed and died, as such (the microorganisms) reproduced. We really are careful. I don’t think that they (infections) are because of us (our HH practices). The most important factor is admitting new patients to the infected patients’ beds right away after they (the previous ones) have been discharged. We clean the bed*

*very well when an infected patient dies...But it doesn’t have any meaning because a new patient comes (to that bed) in half an hour.”*

*Cleaning personnel, female*

While most of the health care workers defined hands as the major vehicle in the development of infections, there was still an ambiguity on when to perform HH among some participants. These participants’ assessment of the need to perform HH was influenced by the concepts of “cleanliness” and “dirtiness”. The perception of “dirtiness” was emotionally sensed. Particularly intimate contact with patients and bodily fluids lead to the feeling of “dirtiness”. The procedures which were carried out outside the ICU were perceived mostly as “clean”.

*[How do you decide to perform HH?]*

*“It is such a sense...If you touch somewhere, you remember that it was contaminated and you need to wash”*

*Nurse, female*

Some participants indicated that the training they got changed their perception of “emotionally” based HH to “indication” based HH. They indicated that they were able to understand HH guidelines more clearly after the training.

*[You said that you wash hands when you feel dirty, so when do you feel dirty?]*

*“Handwashing when feeling dirty was (something we did) before the training. There are five principles (indications for HH). We (started to) wash our hands in line with these principles after the training. Before it was according to our emotions. The training was so beneficial...”*

*Nurse, female*

The training the participants were referring as “beneficial” was the one-to-one training that was delivered by the infection control team. The features of this training are explained in the following section.

#### *The role of HH in self-protection*

The need to perform HH when feeling “dirty” might have shaped from a drive of self-protection. Most of the participants were anxious of getting infected and transmitting the infections to their family members. So HH was indicated to be practiced more frequently and meticulously after patient contact.

*“Primarily, everyone is washing hands after touching the patient, to protect themselves. Not to transmit the disease to the patient is the second concern.”*

*Nurse, female*

### *Subjective norms*

#### Social cohesion

Participants indicated that their sense of belonging to the multidisciplinary ICU team was low. Instead they mostly identified themselves with their own professional group as “doctors”, “nurses” or the “cleaning personnel”. This perception was reflected to the expressions of the participants, they typically used the concepts of “us” and the “others” during the interviews. So, whenever an infection developed, each professional group accused the other for being inattentive. This problem deepened when a member of a professional group gave a feedback to a member of another profession. A simple feedback related to HH from a doctor to a nurse or vice versa was perceived as a severe criticism and resulted with a retort. Discussions were shaped around “you and us” and “blame and blameful” instead of objectively assessing the situation where HH was missed.

*“I witnessed an argument with an attending physician and a nurse...One of our attending physicians informed a nurse colleague. And she (attending physician) did it so dulcely, not in a firm way. She said – look, you forgot to wash your hands when passing from this place to that place –. She got a strong reaction from the nurse. The nurse argued back saying – we (nurses) are doing (HH), we pay so much attention (to HH), and in reality, you (doctors) are not doing it–. So, they fall into an argument”*

*Nurse, female*

A feedback given from an HCW to another within the same professional group was accepted rather easily. Also, the seniority of the HCW giving feedback and the wording and style of the feedback determined its acceptability.

All of the participants indicated that when a feedback was given from the infection control team during one-to-one training it was received favorably. The infection control team was not present in the ICU constantly, but they had been visiting the ICUs regularly and giving one-to-one trainings. Infection control nurses after taking the consent had been observing the HCWs for some time regarding their infection control practices. After the observations the infection control nurse had been giving individual

feedback on one-to-one basis. This kind of on-job-training was stated to enhance the positive behaviors while providing an opportunity to correct the wrong practices. The positive language and the constructive attitude of the infection control nurse were also indicated as important determinants of the communication.

*“For example, the infection control nurse makes bed-side visits with our nurses. I see a huge impact of this....She (the infection control nurse) sometimes makes observations. She motivates the staff. She says ‘You paid attention to everything, congratulations, this is good. If she sees a non-compliant staff she says I saw you, you did such and such, you shouldn’t have done that...’ She provides an individual based feedback....I continuously tell them (to clean their hands), but it has a more impact when someone outside (the ICU) tells them during a bed-side visit. Also, she doesn’t talk in an offending way, she talks in a very appropriate way....The infection control nurse also serves as a role model (for the staff) during the bed-side visits. She (the infection control nurse) cleans her hands, and afterwards I observe my nurses also clean their hands. .... My colleagues are not irritated by the infection control nurse...”*

*Nurse supervisor, female*

The polarization between the professional groups and its impact was articulated by almost all participants. Still the desire to form a team spirit and to work in a peaceful environment was significant in all of the HCWs. Particularly the directors of ICU and the attending physicians indicated the need and their intention to build a collaborative culture in the ICUs.

#### *The role of peer pressure*

Participants indicated their colleagues were supportive regarding HH practices. But a cleaning personnel indicated that when he carried out the infection control practices meticulously, he was treated like a “figure of fun” by his colleagues. He indicated that when he carried out the procedures in accordance with the standards, he was made fun of by the other cleaning personnel. This prevented his motivation to carry out the patient care activities attentively and in the appropriate way. He indicated that staff was working in accordance with the standards only when they were under the observation of an HCW with a higher hierarchical position. The cleaning personnel indicated that most believed that they needed to “know” the infection control practices, but they didn’t need to “practice” them.



*“Infection (control) nurses come, it changes when they come but everything reverts back when they go... The ones who say let it go are predominant. It takes two or three minutes more work to clean decently from poorly. These few minutes are neglected so to say. If you carry out (a task) properly, they (the other cleaning personnel) look at you weirdly. Like they are making fun of, I don’t know how to say it...As if they are saying – look, he is doing it according to the directives - .... We commonly have this (understanding); know (something) when you need to say it, learn it, but you don’t have to practice it”*

*Cleaning personnel, male*

Although the directors of the ICUs were aware that staff performed HH more often when administrators were present, they had difficulty addressing it.

#### *Behavioral control*

##### High workload and problems related to work-flow

Increased workload and time constraints were considered as important barriers to perform HH practices. All HCWs, but especially nurses and cleaning personnel worked more intensively. Most of the time, the patient: nurse ratio was over 2:1. Staff shortage was mostly result of a high turnover rate. And due to the high turnover, trainings were carried out repeatedly for the newcomers.

Increased workload lead to failures in HH practices. HCWs didn’t have the time to perform HH in every indication. Sometimes due to the high workload they couldn’t notice that an indication rose and so missed a HH opportunity. Also, intense work with problems in environmental and social conditions lead to burnout. If the workload was very high, they practiced HH according to the sense of “dirtiness” not the indications and were obliged to prioritize self-protection.

*“If I take care of two patients I do it more devotedly. But sometimes we have four patients. Then I start to wash my hands not for the patient but for my own health. Because I can’t cope with it. At least I feel clean, I psychologically feel relieved.”*

*Nurse, male*

Also, emergencies, distractions in the routine work-flow and obligations to move to other tasks were considered as important barriers.

## **Discussion**

HH behavior is classified into two types of practice as inherent and elective handwashing [6,23]. Inherent HH practices originate from instinctive need to remove

dirt from the skin and are carried out when hands are visibly soiled or feel sticky. Whitby *et al.* suggest that this type of practice shapes during the first decade of life. HCWs practice inherent HH after touching an “emotionally dirty area” [6,9,15,23]. Self-protection which forms the basis for inherent behavior is the primary motive for HH among HCWs [6,9,15,18,20,23]. In contrast, HH occurs in more specific opportunities not encompassed in the inherent category. This category corresponds to some indications of HH during patient care. Our results reveal that HCWs mostly practiced HH depending on the sense of “dirtiness” and “cleanliness”. Intimate contact with patients leads to the feeling of “dirtiness” and resulted with inherent HH practices. Particularly when time is limited in high work load conditions, HCWs can act through a self-developed hierarchy of risk for HH. So elective HH opportunities are omitted and intrinsic HH is carried out [6]. The high workload with a patient: nurse ratio over 2:1 would also have led our HCWs to prioritize inherent HH compared to elective HH.

Some of the participants in our study indicated that the training they got changed their perception of “emotionally” based HH to “indication” based HH. Training was perceived to ease the learning process and strengthen the rapport of the ICU workers with the infection control team. But it should be noted that the training which was referred to be effective was one-to-one on-job training delivered by the infection control team. Infection control nurses observed the HCW and provided immediate feedback supporting the right practices and offering solutions for improving the wrong ones. Direct observation and immediate feedback might provide a more objective assessment for missed HH opportunities and HH education might be more effective when delivered in real time as mistakes occur because multiple demands that require task prioritization impact attention [24,25].

We suggest that the infection control team should continue delivering HH trainings based on observation and immediate feedback. Still there is need to shape this training model on a structured behavioral modification program. Fuller *et al.* evaluated a behaviorally designed feedback intervention on HH compliance. In the intervention, HCWs were observed, immediate feedback was provided on their compliance and they were helped to formulate an action plan to improve their behavior. The authors report a moderate but a significant sustained improvement in HH compliance compared to routine practice [26]. We suggest to reshape these trainings through a structured behavioral approach and test their efficacy in future studies [6].

Bernard *et al.* in their work identified three patient safety cultures: Environmental/ individual safety culture, blaming safety culture and collaborative safety culture [27,28]. In the environmental/individual safety culture biological risks are not linked to the HCW, rather they are perceived to be present in the environment. In the blaming safety culture, risks are perceived to be related to lack of compliance of the HCW with the infection control practices. And lastly in the collaborative safety culture, biological risks are perceived to be prevented and controlled through a team effort. In our research although few, there were participants who had underestimated the role of hands in infection development. These participants considered that environmental factors were more vital than HH practice for infection prevention. Some of the methods they suggested were not even evidence based as “leaving the patient bed/room for rest”. Studies also indicated that some HCWs don’t have the correct understanding of the importance of HH and personal beliefs about the efficiency of HH might be a barrier [5,9,13,15,29]. This perception is similar to the environmental/individual safety culture defined by Bernard *et al.* [27,28]. Participants holding this view underestimate their responsibility in the development of infections. Also, the higher likelihood of HH behavior when seniors were present and the concept of “knowing the infection control practices, but not practicing them” was linked to this view. Why these participants have difficulty in failing to recognize the causal role of hands in infection development should be further explored and addressed.

Blaming safety culture was the predominant one observed in our study. Most of the participants were very well aware that the main reason for infection development was HCWs’ failure to comply with the infection control standards. But we observed that low sense of belonging to the ICU team and low social cohesiveness mostly prevented these participants to address the problem effectively. The polarity between doctors and nurses resulted with one group accusing the other for not complying with the infection standards. Studies also show that some staff groups indicate that they are compliant with HH guidelines while others are not [13]. Organizational culture is very important in giving and receiving HH feedback [5,19,30] and we observed that the blaming safety culture prevented HCWs to comment on HH practices of their colleagues. Still it is important that the directors of the ICU and the attending physicians had indicated their intentions to build a collaborative safety culture. Highest rate of HH can be achieved when HCWs perceive HH as a

collective and shared responsibility [17,27,28]. Interventions that address a transformation in the organizational culture in which HH is an administrative expectation show promising results [31]. Hence, we need to find innovative methods to transform the blaming safety culture to a collaborative safety culture with a shared accountability.

Our study has some limitations. Firstly, due to its qualitative nature, our findings can’t be generalized. Also, there were only few participants from some groups as academic staff, attending physicians and cleaning personnel, which might have prevented us to identify differences between the professional groups. Some of the HCWs might have not expressed their opinions freely leading to social desirability bias. We tried to prevent this bias by securing their confidentiality.

In conclusion, we suggest that the next step should be to base the one-to-one training method on a behavioral modification program and test its efficacy through a quasi-experimental design. Transforming the blaming culture to a collaborative safety culture is also crucial to increase HH compliance. While the directors of the ICUs have their mindsets ready for this transformation, we have to work on how to proceed for such a change since the process is expected to be very complex and timely. Barriers related to behavioral control as high workload and problems related to workflow should also be addressed. We also have to look more deeply into the working conditions and organizational culture that lead to high turnover rates.

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### Corresponding author

Uluhan Sili, MD, PhD

Marmara Universitesi, Pendik Egitim ve Arastirma Hastanesi, Enfeksiyon Hastalıkları Anabilim Dalı, Pendik, 34896 Istanbul Turkey

Tel: +90 216 625 4693

Fax: +90 216 625 4790

Email: uluhan@hotmail.com; uluhan.sili@marmara.edu.tr

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