

Factors affecting hand hygiene behavior among health care workers of intensive care units in teaching hospitals in Korea: importance of cultural and situational barriers

■ Heon-jae Jeong¹, Heui-sug Jo², Hye-jean Lee³, Min-ji Kim⁴, Hye-yeon Yoon⁵

■ Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore¹, Department of Health Management and Policy, School of Medicine, Kangwon National University², Department of Preventive Medicine, Kangwon National University Hospital³, Annenberg School for Communication, University of Pennsylvania⁴, Center for Patient Education, The Care Quality Research Group, Pittsburgh⁵

■ Correspondence : Heui-sug Jo

Address : Kangwon University Road 1, Chuncheon, Gangwon, South Korea 200-947

Tel : +82-33-250-8910

FAX : +82-33-255-8809

E-mail : choice@kangwon.ac.kr

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Abstract

In Intensive Care Units (ICUs), where severely ill patients are treated, importance of reducing Hospital Acquired Infection (HAI) cannot be overstated. One of the simplest and most effective actions against HAI is proper hand hygiene (HH) behavior of Health Care Workers (HCWs). However, compliance varies across different cultures and different job types of HCWs (physicians, residents and nurses). This study aims to understand determinants of HH behavior by HCWs' job types in Korea. Qualitative analysis was performed based on Reasoned Action Approach style interviews with staff physicians, residents and nurses across 7 teaching hospitals. We found that all HCWs strongly believe HH is important in reducing HAI. There were, however, job type-specific HH behavior modifying factors; staff physicians stated feeling pressure to be HH behavior role model. Residents identified Quality Improvement team that measured compliance as a facilitator; a notable barrier for residents was senior physicians not washing their hands, because they were afraid of appearing impudent to their seniors. Nurses designated their chief nurse as a key referent. All participants mentioned heavy workload and lack of access to alcohol-based sanitizer as situational barriers, and sore and dry hand as deterrents to HH compliance.

Key words

Patient safety, Hand Hygiene, Hospital acquired infection, Intensive Care Unit (ICU), Safety culture, Reasoned action approach

I. Introduction

Hospital Acquired Infections (HAIs) are among the serious threats to patient safety, and many efforts have been made to eliminate them.[1] Among the various ways to win the battle against HAIs, hand hygiene is considered to be one of the most effective and simplest,[2,3] but Health Care Workers' (HCWs) compliance with hand hygiene guidelines is far from perfection, with an overall average of 38.7%.[4] which prompted various initiatives in different countries to increase compliance. [5–10]

HCWs' hand hygiene is particularly important for patients in Intensive Care Units (ICUs). Patients in the ICU require multiple contacts with HCWs,[11] and their immune-compromised state, along with multiple catheters inserted, make them very susceptible to HAIs.[12] Therefore, many studies have examined HCWs' hand hygiene behavior in the ICU setting and have suggested various strategies.[12–17]

ICUs in Korea have also tried to improve HCWs' adherence to hand hygiene to reduce the occurrence of HAIs.[18] However, few studies have investigated determinant factors for the hand hygiene behavior of HCWs in Korean ICUs. [19] Information from previous studies conducted in other countries might be utilized, but has limited value in the Korean context; as Hofstede pointed out, each country possesses a hugely different culture,[20] which may result in the failure

of a quality and safety improvement program with proven success in other countries.[21] Thus, to improve the hand hygiene compliance of HCWs in ICUs in Korea, the first step is to understand behavioral determinants of HCWs' hand hygiene behavior.[1]

The current study, therefore, aims to explore HCWs' attitudes toward hand hygiene behavior as well as cultural and situational factors specific to Korean ICUs that can facilitate or hamper such behavior. This study focuses on collection of all factors related to hand hygiene compliance, without quantification. In addition, this study tries to capture differences, if any exist, in those factors across different job types – staff physicians (usually professors), residents and nurses – which are the three major professions who see patients in ICUs.

II. Methods

1. Participants

A purposive sampling method was used to recruit HCWs working in ICUs of seven teaching hospitals in South Korea. Participants were selected across three different job types: staff physicians (n=9), medical residents (n=13) and nurses (n=11) (Table 1). Typically, nurses were stationed in the ICU, whereas physicians occasionally visited the ICU and saw their patients only as needed. Interviews were conducted until all themes were saturated; initially HCWs in five

teaching hospitals in Seoul were interviewed until no new distinct themes emerged,[22–24] then the process was repeated in two hospitals in Gang-

won province to confirm that there was no new theme on hand hygiene behavior.

Table 1. Characteristics of Participants

	Staff physician		Resident		Nurse	
	n	%	n	%	n	%
Gender						
Male	6	66.7%	6	46.2%	0	0.0%
Female	3	33.3%	7	53.8%	11	100.0%
Department						
Medical	5	55.6%	7	53.8%	7	63.6%
Surgical	4	44.4%	6	46.2%	4	36.4%
Age						
20 – 29	0	0.0%	9	69.2%	5	45.5%
30 – 39	5	55.6%	4	30.8%	5	45.5%
40 – 49	4	44.4%	0	0.0%	1	9.1%
Total	9	100.0%	13	100.0%	11	100.0%

2. Face-to-Face Interviews

A single interviewer (HJL) led all 33 face-to-face interviews with participants in order to avoid any interviewer-related bias. Each interview took 30–90 minutes, was recorded under the participant's consent, and was transcribed for analysis. Survey was performed in Korean and translated into English. During the introduction, the interviewer clarified the purpose of the study and defined hand hygiene behavior as *'hand washing with water and soap or with*

alcohol-based sanitizer, before and after seeing a patient in the ICU.' Though this definition is less comprehensive than that included in the World Health Organization guidelines on hand hygiene,[4] it is a standard that most hospitals in Korea follows given their ICU settings, where most patient beds are located close together in a large hall. All interviews were conducted from November 2010 to February 2011. Because most new residents join the hospital in March, we chose this time frame to ensure respondents were well corroborated in hospital's culture.

3. Semi-structured Interview Guide

An interview guide was developed before the interviews took place based on the Reasoned Action Approach (RAA), an extended model of the Theory of Planned Behavior (TPB) that has been widely used in health-related behaviors, including HCWs' hand hygiene behavior (Table 2).[25–31] TPB posits that three constructs predict behavioral intentions: attitudes (perception of the behavioral outcomes), subjective norm (perception of others' approval of the behavior),

and perceived behavioral control (perceived ability to overcome obstacles to perform the behavior). The major difference between RAA and TPB is the addition of descriptive norm (how others behave) to the construct of subjective norm. Since previous studies have shown that role modeling is important in HCWs' hand hygiene, RAA adds great value to the original TPB components in providing an understanding of hand hygiene behavior among HCWs.[13,32] Questions shown in table 2 were adapted and modified from Montano et al.[24]

Table 2. Interview Guide Questions

Domains, Questions
Attitudes
What would you expect from hand hygiene behavior?
What are the pluses of engaging in hand hygiene behavior?
What are the minuses of engaging in hand hygiene behavior?
Subjective Norms
Who influences your hand hygiene behavior, and how?
Describe their hand hygiene behavior. (Descriptive Norm)
Perceived Behavioral Control
What things or situations make it easy for you to engage in hand hygiene behavior?
What things or situations make it difficult for you to engage in hand hygiene behavior?

4. Analysis

Content analysis on the scripts was conducted by two researchers (HJJ and HYY) to identify

common themes and key points using ATLAS.ti software. A third researcher (HSJ) resolved disagreements.

III. Results

As table 3 shows, a total of 17 themes emerged. Except for subjective norms, where each job type

designated different normative referent (shown in the parenthesis), all the three job types stated similar themes and comments.

Table 3. Emerged Themes and Comments

Domains	Themes	Comments
Attitudes: (+) advantage; (-) disadvantage	(+) Fulfill their occupational responsibility to patients	“Hand hygiene is one of the very basic things and also responsibility that a clinician must do.” [staff physician]
	(+) Protect patients and HCWs from cross-infection	“Patients in ICU are seriously ill. So if I do not wash my hands, they would easily be infected.” [resident] “There are little kids at my home; I am afraid I may transfer germs to them if I do not wash my hands thoroughly.” [nurse]
	(+) Accurate diagnosis	“If I didn’ t wash my hands, I would pass the patient without checking for possible bleeding or bedsores.” [resident]
	(+) Develop good rapport with patients	“Patients would be happy to see me wash my hands before I touch him.” [nurse]
	(-) Skin dryness and soreness on hands	“Alcohol-based hand rub sometimes hurts, but hand hygiene is my occupational responsibility and I will do it anyway. [staff physician]”
	(-) Consumes too much time	“We could save the time for other duties if we didn’ t wash our hands.” [nurse]
Subjective Norms – normative referents	Quality Improvement (QI) team (Nurses, Residents)	“One of my co-workers received an email saying that she did not wash her hands. ... I felt like I should do it more diligently.” [nurse]
	Senior nurse (Nurses)	“Seeing my senior washing her hands makes me do the same.” [nurse]
	Senior staff physicians (Residents)	“We just learn from what seniors do. They don’ t tell us what to do.” [resident]
	Every HCWs (Staff physicians)	“As senior staff in this ICU, I should be a role model. What would the ICU family say if I don’ t wash my hands?” [staff physician]
	Patients (Nurses, Residents, Staff physicians)	“If a mentally alert patient were to see me not wash my hands, she would think she’ s not getting a good quality of care.” [nurse]

	(-) Emergency	“Many ICU patients are connected to the machines. ... When the lines get accidentally disconnected, I can’t pay attention to hand hygiene” [nurse]
	(-) Too great workloads	“Sometimes we have to do several things at the same time, such as checking the blood pressure or emptying the urine bags ... I can’t wash my hands every time. It gets really busy if one of the patients is seriously ill.” [nurse]
Perceived Behavioral Control: (+) facilitators; (-) inhibitors	(+/-) Accessibility to sink or alcohol based sanitizer	“I feel annoyed when I push the lever and the alcohol-based hand rub doesn’t come out well due to (hospital’s) poor management.” [staff physician] “When there’s no hand rub left, I think, ‘No one really cares. This pump broke and nobody changes it.’ ” [nurse]
	(-) Seniors not washing their hands	“If I wash hands when [my senior] doesn’t, I will lose favor in his eyes.” [resident]
	(-) When they make a round in the ICU as a member of a care team	“I can wash my hands even when I have so many patients, because I can control the time. ... During the round, I can’t wash or sanitize my hands. I may interrupt the round.” [resident]
	(+) Reminder sign for hand hygiene	“We have a reminding sticker beside the beds of MRSA or VRE patients. A ‘C’ sticker, standing for ‘contact’, is attached to the bed. [When I see it] I think, ‘Oh, I should wash my hands.’ ” [resident]

1. Attitudes

Advantages of hand hygiene behavior. Participants across all three groups stated that hand hygiene enabled them to *fulfill their occupational responsibility to patients*. They reported that their positive or negative feelings toward hand hygiene did not influence their actual behavior.

The most frequently mentioned advantage was that hand hygiene would *protect patients from cross-infection*. This statement was often followed by a similar belief that hand hygiene would *protect the HCW* as well. Although many participants mentioned both at the same time, most

mentioned protecting patients first. Some admitted that they worried more about their family members than about themselves.

Physicians mentioned that proper hand hygiene is tightly linked with accurate diagnosis as it enabled them to conduct physical examinations. Physicians emphasized the importance of physical examinations, noting that they tended not to touch the patient if they believed their hands were not clean and were in possible danger of transmitting infection.

On the emotional side, participants reported that hand hygiene would help them to *develop good rapport with patients*. Most ICU patients

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are barely conscious, but participants still thought that washing hands before and after seeing the patient was a way of showing their sincerity toward the patient. Also, they mentioned that patients would be happy to see them wash their hands.

Disadvantages. The most commonly reported disadvantage of hand hygiene was *skin dryness and soreness on hands* due to frequent washing. However, few participants considered disadvantage to be serious enough to outweigh their obligation to perform hand hygiene practices.

There were comments that hand hygiene consumes too much time, making it difficult to do their other duties. Some of those who mentioned this also raised a question about the effectiveness of alcohol-based hand rub. A staff physician stated, "I don't believe alcohol-based hand rub is really as effective as soap and water, and washing hands with soap and water takes too much time. So when I'm really busy, I can't wash my hands. I think it's better for patients to meet their needs than to waste my time washing my hands."

2. Subjective Norms

This section describes the results by job group, since differences across the groups were observed.

Nurses designated the *Quality Improvement (QI) team* in the hospital as normative referent; this team regularly monitored their hand hygiene behavior and provided feedback, thus making them

feel under a certain level of invisible pressure. The QI team was also said to exert influence by implementing various campaigns, such as hand hygiene reminders on computer screens and hands-on experiments allowing participants to compare the culture results of their washed and unwashed hands. A nurse even stated that the mere existence of a QI team is a symbol that the hospital really wants to improve the quality of care. Other influential referents for nurses were the *senior nurses* in their work area. Nurses mentioned that seeing their seniors wash their hands encouraged them to do the same. They also reported that hand hygiene practices seemed poor among medical residents, but it did not affect nurses' own behavior.

For residents, *senior staff physicians* were the most influential referent. Participants reported that, since medical school, they had learned everything by observing how their seniors behaved. The QI team was identified as the second most influencing referent for the same reasons as stated by nurses. Medical residents also reported that nurses did not wash their hands well but that they were not the influential referent for the residents.

Staff physicians stated that no one really affected their hand hygiene behavior, but they acknowledged that they would care if their juniors were watching them and that they felt they should be *role models*.

Patients were the repeatedly mentioned referent across all groups. Participants felt a certain responsibility for them.

3. Perceived Behavioral Control

Emergency was one of the barriers to hand hygiene commonly mentioned by participants. They stated that the patient's life should be the first priority in an emergency and thus hand hygiene can be excused at such times.

Participants also mentioned that they often forgot to wash their hands or skipped it *when their workloads were too great*, such as when new patients come in or when multiple patients need to be taken care of simultaneously.

Accessibility to sink or alcohol based sanitizer played an important role as both facilitator and barrier in all three groups. Participants stated that they almost automatically washed their hands if a sink or an alcohol-based hand sanitizer was nearby when needed but that they did not if these things were located too far away. Some physicians mentioned that they used nurses' alcohol swabs instead if they could not find any nearby alcohol hand rubs.

In addition to the aforementioned accessibility, participants reported difficulty in conducting hand hygiene when alcohol-based hand sanitizer ran out, when towels were dirty or when there were no napkins available to dry their hands. Moreover, these situations made HCWs feel that the hospital was not supporting the hand hygiene, and some participants even expressed anger.

For residents, the greatest situational barrier was when their *seniors did not wash their hands*. Residents were afraid of appearing impudent to

their seniors; they explained that they work in a very hierarchical culture and that washing their hands when their seniors did not would make them seem as if they were finding fault with them. On the contrary, when their seniors did wash their hands, this was a good facilitator of residents' hand hygiene. Residents also mentioned that *when they make a round in the ICU as a member of a care team* with their seniors, they often could not wash their hands because they were afraid of breaking or slowing down the flow of the rounds.

A reminder sign for hand hygiene in front of the patient's bed or the sink was a common facilitator. Participants reported that any recognizable sign related to hand hygiene was helpful, from a simple hand picture or special symbol to a poster describing how to wash hands properly.

IV. Discussion

This study explored factors related to HCWs' hand hygiene compliance specifically in ICU settings of Korean teaching hospitals. With the help of a qualitative study design, we investigated HCWs' attitudes toward hand hygiene, as well as the social, interpersonal and environmental determinants of hand hygiene for three different types of HCWs working in ICUs: staff physicians, residents and nurses.

Behavioral beliefs regarding the advantages of hand hygiene behavior were very strong across all participants; participants believed proper hand hygiene protects their patients and themselves

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from cross-infections. This finding corresponds to the result of a study by Sax et al. among HCWs who have extensive exposure to hand hygiene campaigns.[1] In addition, many physicians stated that hand hygiene allows them to conduct physical examinations, which lead to better decisions. This finding suggests that HCWs who have already been well educated hold favorable outcome beliefs at the higher level than what intervention programs often provide. Therefore, it is not the lack of knowledge that is hampering their compliance with hand hygiene.

Bischoff et al. reported that a patient awareness program to generate pressure for HCW to engage in hand hygiene was not effective.[33] However, we found that HCWs believed that a (mentally alert) patient would be glad to see HCWs wash hands before seeing the patient, thus improving rapport with patients. Furthermore, HCWs thought of hand hygiene adherence as fulfilling their occupational responsibility to patients. This finding suggests that hand hygiene adherence might be considered by HCWs to be a moral or ethical duty.

All the participating HCWs designated time consumption as an important issue regarding hand hygiene. McArdle et al. reported that it might take about 230 minutes/day/patient to achieve complete hand hygiene compliance.[11] Some HCWs in this study, while they strongly believe in the importance of hand hygiene, also have concerns about how to prioritize hand hygiene compliance among all other necessary tasks for patient care. This concern is along the lines

of the statement that HCWs cannot easily adhere to hand hygiene when their workload is too great, which is supported by the result of a study by O'Boyle et al. that work intensity was the key determinant factor in HCWs' hand hygiene compliance.[34] In addition, our study found that in emergency situations, HCWs perceived it as acceptable to omit hand hygiene practices. These findings suggest that realistic workload distribution is necessary to ensure a high level of hand hygiene compliance. However, such effort can only be realized with a huge resource investment, which may not be possible at present. Instead, each ICU should devise more precise guidelines that clearly describe when hand hygiene should be bypassed for patients' benefit in a given situation.

It should be noted that many HCWs stated that QI teams' monitoring and feedback on hand hygiene compliance encouraged them to wash their hands. Monitoring has been mainly considered as a tool to evaluate hand hygiene improvement programs.[10,35,36] From this standpoint, how to prevent the Hawthorne effect was the key issue.[9,37] However, the finding of this study suggests that making HCWs aware that their hand hygiene compliance is being monitored might be integrated as a component of hand hygiene programs, rather than regarding it as mere noise or bias from observation to avoid.[38,39]

Social pressure originating from the hierarchy among HCWs emerged strongly from all participants, but their directions varied widely. As noted in many previous studies, role mod-

eling was important for both nurses and residents,[1,13,32,40] but they mentioned only the seniors in the same job type as role models. Erasmus et al. pointed out that most physicians do not consider themselves as role models,[40] but staff physicians in this study stated that they felt they should set a standard. Residents stated that they felt they could not wash their hands when their senior did not due to their fear of appearing to be belittling their seniors. Also in group round situation, residents had difficulty engaging in hand hygiene without slowing down the team's round process. Similar findings were observed in other studies,[40] but the strict hierarchy in Korean hospitals might have made these effects worse.[21] Though still anecdotal, a hand hygiene strategy in a US hospital is worth noting: to overcome such hierarchy, the president of the hospital made a clear rule stating that every medical student doing clerkship must wash their hands regardless of what their seniors do. Soon, the seniors began to comply with hand hygiene guidelines as well. It seems necessary for each hospital and department to develop its own creative strategy, reflecting its culture and relationships among its HCWs.

Bischoff et al. suggested that accessibility to a sink or alcohol dispenser was important,[33] and this study observed similar findings. However, when the equipment was accessible but not ready to use (e.g., dirty towel or empty dispenser), HCWs not only felt difficulty in washing their hands but also interpreted the situation as a lack of hospital management's support in hand

hygiene. According to Montano et al.,[24] such frustration undermine the HCWs' positive attitude toward hand hygiene, eventually lowering their adherence. As Frambach et al. reported,[41] this finding emphasizes the importance of organizational adoption: the hospital's support is a prerequisite for individual HCW's good hand hygiene behavior.

All participants in this study were recruited from teaching hospitals and therefore, different considerations may be required to apply the results in other hospital settings. However, selecting teaching hospitals as the study setting has enabled the authors to better observe the effect of hierarchy, a well-known characteristic in South Korean culture, on HCWs' hand hygiene behavior.

It is worth noting that the number of participants in each group is not very large. However, no more new themes emerged after approximately half of the interviews were completed, signaling that sufficient data had been collected.

V. Conclusion

The current study indicates that HCWs are already well versed in terms of the benefits of hand hygiene and, therefore, that generic information campaigns will not be effective in further enhancing hand hygiene behavior among HCWs; on the other hand, the findings suggest that efforts to remove situational barriers to performing hand hygiene behaviors should be made more effective. Also, considering the importance of subjective norms, strong support from other HCWs, espe-

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cially from one's superiors and the organization is crucial.

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