

## ■ Original article

## Effect of involuntary motivational factors on hand hygiene by health care providers

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(Received: 29 Jun 2015; Accept: 28 Sep 2015)

### Abstract

**Background and Purpose:** Hand hygiene is a low-cost, convenient measure recommended to all health care providers to prevent nosocomial infections. Health care staff commonly neglect the importance of hand washing at workplace. This study aimed to evaluate the effect of involuntary motivational factors on hand hygiene compliance by health care providers.

**Methods:** This descriptive analytical study was conducted on 153 health care providers, selected via simple random sampling. Data were collected using questionnaires designed based on the theory of planned behavior (TPB). Data analysis was performed in SPSS, using descriptive and inferential statistics, Pearson's correlation-coefficient and T-test.

**Results:** In 80.40% of cases, participants reported that they washed their hands after contact with patients or hospital equipment. Moreover, participants had a positive attitude towards the consequences of hand washing ( $6.11 \pm 0.8$ ) and considered this behavior as a norm ( $6.12 \pm 1.2$ ). Correlations observed between most variables of study were significant ( $P \leq 0.001$ ). However, controlling factors had a less significant effect on hand hygiene intention compared to other variables, such as outcome evaluation, subjective beliefs and normative beliefs of participants ( $P \leq 0.001$ ).

**Conclusion:** According to the results of this study, health care providers have a positive attitude towards hand hygiene compliance. However, due to the impact of involuntary motivational factors on this behavior, it is necessary that medical authorities identify major strategies for behavioral change of health care staff through predicting these underlying factors.

**Keywords:** Hand hygiene, Health care providers, Motivational factors

### Introduction

Nosocomial infections are considered as a significant threat to patient safety imposing high costs on healthcare system (1). According to statistics, nosocomial infections affect two million people every year, and 19 million die due to these infections (2). Nosocomial infections, also known as hospital-acquired infections, increase treatment costs and average length of hospital stay by 5-7 days. In one study, Akyol reported the transmission of microorganisms from caregivers' hands as the

main source of hospital-acquired infections (3).

Hand washing is the most effective way to prevent nosocomial infections. Hand hygiene compliance is recommended to all health care providers as a convenient, inexpensive measure, as well as the first step to control infections (4, 5).

Previous research has indicated that health care providers are not accustomed to hand washing as expected (6). Instructions at every medical center urge health care staff to wash their hands with soap

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and water, chlorhexidine gluconate and alcoholic gel before and after contact with patients or hospital equipment (7). Nonetheless, health care staff are often unaware of the importance of hand hygiene and assume it to be necessary only after contact with patients or contaminated equipment (3).

In Iran, studies have indicated that standard hand hygiene compliance is relatively unfavorable in hospitals. Similar to international studies, adherence of health staff to hand hygiene standards in our country has been reported to be 30-50% (8, 9).

According to the literature, some of the factors involved in negligence of hand hygiene by health care staff are stimulant properties of disinfectants, lack of hand washing habit, laziness and lack of awareness, high work pressure, insufficient facilities (e.g., disposable towels) and disregard of nursing management (10). It must be noted that human behavior has a complex pattern and is the result of internal, biological, environmental, educational and cultural interactions of individuals (11).

Behaviors revolving around personal hygiene are affected by individual experience, attitude and occupational requirements (4). Involuntarily motivational factors influencing hand hygiene behavior could be predicted and evaluated. In this regard, causes of hand hygiene negligence should be identified among caregivers, and effective strategies should be established to change current behavioral patterns.

In recent years, psychological studies have investigated influential factors in the behavior of health care professionals (12). Several theories have been proposed on predicting and changing behavioral patterns in these individuals; such example is the theory of planned behavior (TPB), which is based on a cognitive approach (13, 14).

TPB is applicable in situations where individuals have control over their behaviors and all circumstances related to their behaviors. According to this theory, three main variables of attitude, perceived behavioral control and subjective norms are involved in the development of a specific behavior (12).

Given the importance of hand hygiene for hospital staff, and considering that only a few studies have

evaluated standard hand hygiene behavior of health care professionals in Iran, this study aimed to evaluate hand hygiene compliance using TPB. Furthermore, we aimed to describe the internal components of this behavior (e.g., attitude, norms, tendencies and controlling factors) based on TPB, as well as to identify involuntary motivational factors affecting hand hygiene observation among health care staff.

## Materials and methods

This cross-sectional study was conducted on 153 health care providers including nurses, physicians and other therapists. Participants were selected via simple random sampling from staff of 17-Shahrivar Hospital in Amol, Iran. Informed consent was obtained from participants, and data were collected using questionnaires designed based on TPB. Questionnaires were extracted from the edited version of Ajzen questionnaire (2009) (6).

With the study population of 270 participants, sample size was determined based on Morgan's table. Reliability of questionnaires was calculated using Cronbach's alpha coefficient ( $\alpha=0.84$ ).

Questionnaires consisted of two main sections: First section focused on demographic characteristics of participants, including age, sex, ward of employment and clinical experience. Second part of the questionnaire had 46 items to measure underlying variables of TPB (i.e., involuntary motivational factors), which were scored on a seven-point Likert scale. Variables measured in questionnaires were as follows:

- 1) Outcome evaluation: This category had six questions to assess the opinion of participants about the outcome of hand hygiene compliance before and after contact with patients (score range: 1=poor, 7=satisfactory).
- 2) Motivation to comply: This category had four questions to evaluate the opinion of participants on frequency of compliance with recommendations on hand hygiene standards (score range: 1=never, 7=always).
- 3) Behavioral beliefs: This category had seven questions to assess the opinion of participants

about the usefulness of hand hygiene compliance in patient care (score range: 1=extremely low, 7=extremely high).

4) Controlling factors: This category had six questions to evaluate controlling factors for hand hygiene compliance by health care staff (1=rare, 7=frequent).

5) Impact of controlling factors: This category had six questions to assess the opinion of participants about the impact of controlling factors on hand hygiene observation (1=strongly disagree, 7=strongly agree).

6) Normative beliefs: This category had three questions to evaluate the opinion of participants about common normative beliefs regarding hand hygiene observation (1=not true, 7=totally true).

7) Attitude towards hand hygiene: This category had six questions to assess the attitude of health care staff towards hand hygiene behavior (1=strongly disagree, 7=strongly agree).

8) Subjective norms: This category had five questions to evaluate the beliefs of participants about norms and standards of hand hygiene observation (1=absolutely false, 7=absolutely true).

9) Intention for hand hygiene compliance: This category had three questions to assess the intention of participants for hand washing before and after contact with patients (1=poor, 7=satisfactory).

After questionnaires, we used self-reports to evaluate participants in terms of frequency of hand washing only before, only after, and both before and after contact with patients. Total scores of participants were calculated within a score range of 1-7, and mean of total scores was used to determine the effect of underlying variables (i.e., involuntary motivational factors) on hand hygiene compliance (14). Participants were given accurate instructions for completing the questionnaires and were assured of confidentiality terms as well.

Data analysis was performed in SPSS V.16 (SPSS Inc., Chicago, IL, USA) using descriptive (mean and standard deviation) and inferential statistics (Pearson's correlation-coefficient and independent T-test), and P value of less than 0.05 was considered significant.

## Results

In this study, 125 participants (81.7%) were female,

and others were male. Mean age of participants was  $29.28 \pm 8.24$  years. Wards of employment for health care providers enrolled in this study are shown in Table 1. According to self-reports, participants washed their hands in 52.29% (SD=29.36) of cases only before, in 80.40% (SD=21.59) of cases only after, and in 55.64% (SD=29.84) of cases both before and after contact with patients.

Correlations between underlying factors and attitude of health care providers towards hand hygiene compliance are presented in Table 2. Mean score obtained for each involuntary motivational factor was indicative of a positive attitude towards hand hygiene observation in the majority of participants. Moreover, they accepted hand washing before and after contact with patients as a norm in medical practice (score:  $6.12 \pm 1.20$ ).

In this study, participants partly believed in controlling factors for standard hand hygiene ( $5.31 \pm 1.20$ ), while only a few confirmed the impact of these factors on compliance with hand hygiene standards ( $4.44 \pm 1.40$ ). The information in Table 2, was show relation between involuntary motivational factors in health care providers.

Regarding outcome evaluation, we observed a significant correlation between normative beliefs of participants ( $r=0.619$ ) and subjective norms about hand hygiene standards ( $r=0.608$ ). However, correlation between the incentive of participants and their intention to comply with hand hygiene standards was not significant ( $r=0.133$ ).

Although viewpoint of our participants regarding the impact of controlling factors was correlated with their normative beliefs ( $r=0.086$ ), this correlation

**Table 1.** Distribution of participants based on employment at hospital wards

Ward	N	%
Maternity	14	9.2
ICU*	23	15
Surgery	32	20.9
Orthopedics	15	9.8
Internal	16	10.4
Dialysis	17	11.1
Emergency	36	23.5
Total	153	100

\*ICU: Intensive Care Unit

**Table 2.** Effect of involuntary motivational factors on hand hygiene compliance based on pearson's correlation-coefficient

Variable	Mean	SD	Correlation							
			1	2	3	4	5	6	7	8
Outcome Evaluation	6.11	0.8								
Motivation to Comply	5.8	1.27	0.292"							
Behavioral Beliefs	5.9	1.1	0.564"	0.370						
Controlling Factors	5.31	1.2	0.280"	0.170'	0.323"					
Impact of Controlling Factors	4.44	1.4	0.223"	0.166'	0.377"	0.488"				
Normative Beliefs	6.12	1.2	0.608"	0.391"	0.426"	0.293"	0.086*			
General Attitude	5.1	1	0.513"	0.269"	0.468"	0.418"	0.350"	0.491"		
Subjective Beliefs	5.8	0.86	0.619"	0.450"	0.606"	0.437"	0.314"	0.577"	0.599"	
Intention	5.4	0.93	0.436"	0.133*	0.459"	0.368"	0.362"	0.255"	0.516"	0.591"

"  $P \leq 0.001$ ; '  $P \leq 0.050$ ; \* Not significant

was not statistically significant ( $P > 0.05$ ). Finally, no significant difference was observed between involuntary motivational factors affecting hand hygiene behavior and parameters such as age, sex and ward of employment ( $P > 0.05$ ).

## Discussion

According to the results of this study, health care providers had a positive attitude towards the consequences of hand hygiene and considered this health measure as a norm in patient care. Our participants believed that correct hand washing could prevent the transmission of infections to themselves, patients and even their family members. In addition, they stated that adherence to standard hand hygiene resulted in a feeling of satisfaction at workplace. In their viewpoint, hand hygiene was not an entirely personal matter, and possible consequences could affect other people as well. Therefore, it seemed logical that others expect health care staff to wash their hands before and after contact with patients to optimize their medical performance.

One study conducted in this regard highlighted the need for continuous and dynamic monitoring of hand hygiene compliance among health care providers (6). According to the participants, factors such as unforeseen events, fatigue, boredom, crowded wards, personal concerns and lack of adequate facilities for hand washing (i.e., controlling factors) could discourage health care staff from regular hand washing. However, impact of these factors was not considered significant by the participants. This point

of view has been shared by many health care staff, such as nurses, in similar studies.

In another research, some of the controlling factors for hand hygiene compliance were reported to be the use of undesirable disinfectants and hand washing liquid, lack of hand washing habit, laziness and impatience, lack of awareness, negligence, high work pressure and lack of desirable facilities for hand washing (e.g., disposable towels) (10).

In one study performed in Turkey, while nurses respected the need for hand hygiene compliance, they were occasionally unable to wash their hands due to heavy workload, lack of adequate facilities for drying hands and hand ulceration caused by repeated washing (3). According to the results obtained by White et al., the main reasons for failure to comply with hand hygiene standards were negligence, forgetfulness and lack of time (13).

In another study, Ravaghi et al. reported that factors such as insufficient resources, heavy workload and poor physical infrastructure of hospital wards were the most significant environment-related obstacles against hand hygiene compliance (5). In this respect, adequate resources need to be provided, and appropriate training is also required in order to motivate health care staff for this particular behavior. Moreover, effective strategies need to be implemented to reduce the effect of time constraints in compliance with hand hygiene standards.

According to the findings of the present study, although motivation was an important factor in hand hygiene observation, it had no significant correlation with intention of health staff to adhere to

hand hygiene standards. As such, individuals were more likely to observe personal hand hygiene if advised by a colleague, professor or family member.

In a study by Pittet et al., it was observed that nurses considered physicians as role models in principles for infection control, including hand hygiene (15). Therefore, it could be concluded that senior authorities play a pivotal role in the promotion of health behaviors among staff at medical systems.

In this regard, Creedon suggested that medical authorities were frequently unwilling to follow global guidelines on personal hygiene (16). On the other hand, Ott and French claimed that authorities lacked enough motivation to change inappropriate personal hygiene behaviors (4). This seems to be caused by the complexity of hand washing habits, as well as internal beliefs of individuals, which are influenced by the several parameters, such as environment, education status and cultural background.

Results obtained by Smiddy et al. indicated that motivational and environment-related factors at workplace had a significant effect on hand hygiene behavior of health care staff (17). According to our findings, motivation to comply had the least significant correlation with the participants' hand hygiene intention. This denotes that priority of hand hygiene and intention towards this behavior cannot be predicted only based on the motivation of individuals to follow instructions. This issue could be due to the complexity of human behavior, especially change of habits for more appropriate behaviors.

One of the most important findings of the current study was that our participants washed their hands more frequently after contact with patients. In other studies, health care providers reported that they washed their hands after contact with patients, environment and hospital equipment (3, 18). Therefore, it could be concluded that they were more concerned with controlling disease transmission from patients than prevention of infections. Nevertheless, hand washing both before and after contact with patients and hospital equipment has been strongly recommended for the prevention and control of infections (18-20).

## Conclusion

In conclusion, although our participants had a positive attitude towards hand hygiene observation, several factors influenced their compliance with principles of this behavior. Considering the complexity of human behavior and impact of involuntary motivational factors on individual intentions, it is recommended that multilateral strategies be implemented as to promote hand hygiene compliance among health care providers.

## Conflict of interest

None declared.

## Authors' contributions

R Nazari contributed to study design, data collection, and manuscript drafting; SA Hasani helped with data collection, and manuscript drafting; S Khazaeinejad assisted with data collection and entering the data into the software.

## Acknowledgements

This article was extracted from a research project conducted at Babol University of Medical Sciences, Iran. Hereby, we extend our gratitude to the Deputy of Research for the financial support of this study. We would also like to thank all the participants for assisting us in this research project.

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