

Investigating the Knowledge, Attitude and Perception of Hand Hygiene of Nursing Employees Working in Intensive Care Units of Iran University of Medical Sciences, 2018-2019

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ABSTRACT

Introduction: Nosocomial (hospital-acquired) infections are one of the most important issues in patients' health and safety. They result in prolonged stay and emerging disabilities among patients, increased antibiotic resistance, increased mortality, and elevated health care costs for both individual patients and healthcare system. Given that the transmission of pathogens in the hospital environment is usually done through contaminated hands of health care employees, hand hygiene observation is effective in preventing nosocomial infections. Research performed in various countries has shown a variety of reasons for non-compliance with hand hygiene such as poor knowledge about this issue and lack of positive attitude towards it. For this purpose, a study designed by us in 2018-2019 aimed to determine the hand hygiene related knowledge, attitude and perception of nurses working in intensive care units of treatment educational centers of Iran University of Medical Sciences.

Methodology: The present research was a descriptive cross-sectional study conducted on a sample composed of 600 nurses, assistant nurses and assistant paramedics working in intensive care units of seven medical educational centers of Iran University of Medical Sciences. The census method was used and 366 (60%) persons have freely participated in the study. Data collection tools, including one questionnaire on demographic and occupational characteristics, two World Health Organization questionnaires on hand

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hygiene knowledge and perception, and the second part of KAP questionnaire regarding hand hygiene attitude, were all provided to nursing employees by referring to the intensive care units, so that they could complete them and deliver the results. Data analysis was performed using SPSS, version 20, software. Using descriptive statistics, frequency distribution tables for qualitative variables and numerical indices of minimum, maximum, mean and standard deviation for the research quantitative variables and analytical statistics (Pearson coefficient, ANOVA and independent T tests), tables related to the comparisons and correlations were provided.

Results: Of all nursing employees who participated in the study, 56.6% had good knowledge of hand hygiene, 71.3% an impartial or neutral attitude towards this practice and 64.5% a high perception of it. A statistically significant relationship was obtained between knowledge and education ($P=0.029$), perception and age range ($P=0.002$), work experience ($P=0.029$), and ward of workplace ($P=0.014$).

Conclusion: Structured, regular and continuous educational programs with various and effective methods to maintain, promote and remove nursing employees' deficit of knowledge should continue more seriously. It is also necessary to identify the factors affecting the promotion of positive perception and attitude among nursing employees about hand hygiene.

Keywords: knowledge, attitude, perception, hand hygiene, nursing.

INTRODUCTION

One of the very important issues in the topic of patients' health and safety is hospital acquired infections (HAIs) or nosocomial infections. Monitoring and preventing such infections should be among the top priorities of each hospital in particular and all health care systems in general to provide higher safety for patients (1). Nosocomial infections result in patients' prolonged stay and emerging disabilities, increased antibiotic resistance, increased mortality, and elevated treatment costs for the individual and the health care system (1-3).

Studies have shown that nosocomial infections in intensive care units (ICUs) are more common than other hospital environments (4). The focus on ICUs is due to the specific epidemiology and high risk characteristics of patients admitted in such care units (5). People hospitalized in ICU have a weakened immune system due to trauma, corticosteroid therapy, or use of various aggressive medical equipments and devices; they are also at high risk for nosocomial infections owing to the necessity of using broad-spectrum antibiotics to control microorganisms that have acquired drug resistance. Patients in such a high-risk setting should be well supported by health care employees, so that their exposure to nosocomial infections could be minimized (6).

The transmission of pathogens in hospital environment is usually via infected hands of health care employees (7), so compliance with hand hygiene has been effective in preventing nosocomial infections (1 and 8) and it has become increasingly important with the emergence of multidrug-resistant microorganisms (9).

Despite the well-known role of hand hygiene in reducing nosocomial infections, previous studies indicated its poor status among health care employees in various regions of the world; therefore, an average worldwide compliance rate of only 38.7% has been reported (1). Research conducted in various countries showed a variety of reasons for non-compliance with hand hygiene such as poor knowledge of this issue and lack of positive attitude towards it (10, 11). Considering the diversity of reasons for non-compliance with hand hygiene, multifaceted programs need to be used to promote hand hygiene to achieve desirable results (12). Continuous and regular training is one of the necessary interventions to promote hand hygiene in hospitals (13, 14).

Research showed that these multifaceted programs would have more efficiency if considered and implemented under a national health program framework in developing countries (1). National Nosocomial Infections Surveillance System (NNIS) has been implemented in Iran since 2006 and all public and private hospitals have been obliged to implement this national plan. One of the programs included in this national

plan was designed for planning regular and continuous training courses regarding various methods of preventing and controlling nosocomial infections, especially hand hygiene, for health care employees (15). Also, since 2013, all hospitals have been evaluated and validated using the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) model, with one of the existing training programs considering the topic of nosocomial infections and hand hygiene as a subset of patient safety (16). If these training programs are at the forefront of hospital work, health care employees can be expected to have a high knowledge and perception about hand hygiene as well as a positive attitude towards this practice (18, 19). For this purpose, in 2018-2019, a study was designed to determine the knowledge, attitude and perception regarding hand hygiene among nurses working in ICUs of treatment educational centers of Iran University of Medical Sciences.

METHODOLOGY

The present research was a cross-sectional descriptive-analytical study. The research sample included 600 subjects (450 nurses and 154 assistant nurses and assistant paramedics and paramedics) working in ICUs of seven treatment educational centers of Iran University of Medical Sciences – Hazrate Rasool (PBUH), Firoozgar, Haftom Tir, Firoozabadi, Shafayehaiaian, Hashemi Nejad, Ali Asghar (PBUH). The census method was used and a total of 366 people (60%) participated in the study freely.

Data were collected via four questionnaires that were provided to all nurses and assistant paramedics and assistant nurses. The questionnaire completion time was 10 minute for nurses and 15-20 minutes for assistants.

The first questionnaire was about demographic and occupational characteristics: age, occupational rank, gender, work experience, working shift, ward of workplace, type of material for hand hygiene, how to dry the hands after washing them, attending formal or informal hand hygiene training classes, and need for retraining.

The second questionnaire was about hand hygiene knowledge according to the World Health Organization baseline questionnaire on the perception of hand hygiene and health care associated infection for health care workers (20).

The knowledge needed to answer questions of the hand hygiene knowledge questionnaire has been provided in the educational and in-service curricula of nursing employees. This questionnaire comprises eight questions and 25 statements. The minimum score is 0 and the maximum score 25. Questions 1, 2 and 6 have four options each, one of which is the correct answer, and there are 12 statements in total. Questions 3, 4 and 8 have four statements each and there are 12 statements in total. The answer of each statement is "Yes" or "No". Question 5 has four statements and the answer of each statement is "correct" or "incorrect". Question 7 contains six statements and the answer of each statements is "washing hands with soap", "hand rubbing with alcohol products", and "none of them". The number of correct answers was counted. Each correct answer received one point and incorrect answers no point. Thus, a score was obtained for each participant, which was then converted to a percentage: a score higher than 75% was considered "good knowledge", 50-75% "medium and lower knowledge", and lower than 50% "poor knowledge". This questionnaire has been previously normalized and confirmed in terms of validity and reliability in the study of Zakeri *et al*, in 2017, and it has been used in the same study (21).

The third tool was the World Health Organization's Hand Hygiene Perception questionnaire (22), consisting of 11 questions and 18 statements. The answers to questions 1, 5, and 11 are 'I know, I don't know'. If one chooses "I know", according to his/her comment, he/she should write down the individual percentage. The answers to the remaining questions are based on Likert's scale scored from 1 to 5. The answering spectrum is in the range 'very low to very high' for questions 2 and 3, 'low priority to high priority' for question 4, 'ineffective to very effective' for question 6 with eight statements, 'unimportant to very important' for questions 7, 8, and 9, and 'without effort to high effort' for question 10. To measure perception, the mean score of perception of these eight questions is calculated: a score less than 3 indicates low perception, 3-4 medium perception, and more than 4 high perception. Questions 1, 5 and 11 (that are about personal and colleagues' hand hygiene performance) were not used in this study, so only eight questions and 15 statements remained.

Scoring is performed according to Likert's scale ranging from 1 to 5. The minimum score is 15 and the maximum score 75. This questionnaire has been previously normalized and confirmed in the study of Khachian *et al* in 2017 (23).

The fourth questionnaire was about hand hygiene attitude, in which the second part of KAP questionnaire for assessing health care students' hand hygiene knowledge, attitudes, and practices was used. This questionnaire consists of 12 statements and is scored based on Likert's scale from 1 to 5. The minimum score is 12 and the maximum score 60. To measure attitude, the mean score of attitude is calculated: a score less than 3 indicates a negative attitude, 3-4 'no idea', and more than 4 is considered a positive attitude. This questionnaire has previously been normalized and confirmed in the study of Najafi Ghezeli *et al*, in 2015, in terms of validity and reliability (24) and has been used in another study (25).

Questionnaires used in the present study were given to the three faculty members of the Faculty of Nursing and Midwifery of Iran, who were also active in patient safety issues, in order to check validity and reliability, and their corrective comments were applied to all questionnaires. Then the questionnaires were provided to 20 nurses and assistant nurses and assistant paramedics working in wards other than intensive care units, in two hospitals of Hazrate Rasoul (PBUH) and Firoozgar, two times, with one week interval. Cronbach's alpha was 0.914 and 0.720 for the hand hygiene perception and attitude questionnaires, respectively, and Kuder Richardson was 0.75 for the hand hygiene knowledge questionnaire.

Data analysis was performed using SPSS, version 20, software. Frequency distribution tables for categorized variables, and numerical indices of minimum, maximum, mean and standard deviation (SD) for research quantitative variables were provided by means of descriptive statistics, and tables related to comparisons and correlations were done using analytical statistics (Pearson coefficient, ANOVA and independent T tests).

Ethical considerations

After receiving the code of ethics from the Research Unit of Iran University of Medical Sci-

ences and receiving permission from authorities and managers of seven treatment educational centers to start the current study, intensive care units were attended, and research aims and nature were explained to all participants who entered the study after obtaining verbal informed consent from each individual subject. □

RESULTS

Demographic and occupational characteristics of nursing employees participating in the study have been presented in Table 1. Most of them were women and bachelor doing shift work, with over 10 years of work experience, who attended informal hand hygiene training classes and have stated that they did not need formal education in the field of hand hygiene.

Investigating nursing employees' levels of hand hygiene knowledge showed that almost half of those participating in the study (56.6%) had good knowledge of hand hygiene (Table 2). Questions about "The most common source of microbe responsible for nosocomial infections" and "Does hand hygiene prevent the transfer of microbe to the employees of hygiene team before doing a sterile procedure?" had the lowest percentage of correct answers (1.4% and 10.4%, respectively).

Importantly, findings of investigations regarding the relationship between demographic factors and knowledge highlighted a statistically significant relationship between knowledge and education ($P=0.029$), but no statistically significant relationships between knowledge and age range ($P=0.207$), gender ($P=0.281$), ward of work place ($P=0.072$), work experience ($P=0.134$), working shift ($P=0.122$), as well as attending in the hand hygiene training class in the last two years ($P=0.352$).

The majority of nursing employees participating in the study (64.5%) had a high perception of hand hygiene (Table 2). Most of them were aware that nosocomial infections would lead to undesirable consequences for the patient (84.2%) and hand hygiene could reduce its incidence (95.9%). Hand hygiene as an important issue related to patient safety was given a high priority (89.1%) in the hospital where they used to work. Also, the majority of nursing employees realized that all programs considered to promote hand hygiene performance in hospital were im-

Variables	Subgroups	Number (percentage)
Gender	Female	262 (71.6)
	Male	104 (28.4%)
Level of education	Master Nurse	16 (4.4%)
	Bachelor Nurse	260 (71%)
	Assistant Nurse	30 (8.2%)
	Assistant Paramedic	57 (15.6%)
	Paramedic	3 (0.8%)
Work experience	Under one year	29 (7.9%)
	1-5 years	73 (19.9%)
	5-10 years	123 (33.6%)
	More than 10 years	141 (38.5%)
Shift work	Morning shift	43 (11.8%)
	Evening shift	11 (3%)
	Night shift	41 (11.2%)
	Shift in circulation	271 (74%)
The kind of material provided to nursing employees for hand hygiene	Both "water and liquid soap" and "hand rub based on alcohol"	366 (100%)
Consuming material for hand hygiene by nursing employees	Using more liquid soap and water	172 (47%)
	Using more hand rub based on alcohol	194 (53%)
How to dry hands after washing	Using tissue paper	335 (91.6%)
Attending in the training classes During the last two years (Yes)	-	300 (82%)
Place of holding training classes	At their hospital	280 (93.4%)
	Outside their hospital	5 (1.6%)
Attending in the training classes with retraining point (Yes)	-	15 (4.9%)
Need to formal training about hand hygiene (Yes)	-	108 (29.5%)

TABLE 1. Frequency distribution of demographic and occupational variables of nursing employees participating in the study, 2018-2019

portant – e.g., hospital chiefs’ support for hand hygiene (82.5%), hand wash alcoholic solution provided in any part of the hospital (89.6%), installing hand hygiene posters in various parts of the hospital (85.5%), receiving training about hand hygiene (91.5%), existence of a simple and transparent guidance about hand hygiene (94.8%), receiving the result of employees’ observing hand hygiene by hospital managers (89%), the role of good model for colleagues

(85%), and patients reminding employees about hand hygiene compliance (69.6%). Most nursing employees have stated that the authorities and managers (86%) as well as colleagues (77.8%) and patients (79.5%) considered hand hygiene compliance very important.

Results provided by investigations regarding the relationship between demographic factors and perception revealed a statistically significant relationship between perception and age

		Number	Percentage	Standard deviation±mean	Minimum-maximum
Hand hygiene knowledge score	75 < (good)	207	56.6	18.54 ±2.48	8-24
	50-70 (medium)	154	42.1		
	50 > (poor)	5	1.4		
Hand hygiene perception score	4 < (high)	236	64.5	63.07 ± 6.93	36-75
	3-4 (medium)	126	34.4		
	3 > (low)	4	1.1		
Hand hygiene attitude score	4 < (positive)	102	27.9	45.98± 4.39	31-58
	43-4 (no idea)	261	71.3		
	3 > (negative)	3	0.8		

TABLE 2. Frequency distribution of levels of knowledge, perception, and attitude regarding hand hygiene of nursing employees participating in the study, 2018-2019

	Knowledge – Perception	Knowledge – Attitude	Perception – Attitude
Pearson coefficient (R)	0.078	0.115	0.519
Probability value (P)	0.135	0.028	0.000
Number (N)	366	366	366

TABLE 3. Correlation between knowledge, perception, and attitude regarding hand hygiene of nursing employees participating in the study, 2018-2019

(P=0.002), work experience (P=0.029), and ward of workplace (P=0.014). Also, the correlation between perception and age was of positive type (P <0.001), meaning that the perception of hand hygiene increased with age, and the mean score of perception in the age range over 40 was higher than the age range under 40 (P=0.003). There was no statistically significant relationship between perception and education (P=0.334), gender (P=0.281), working shift (P=0.199), and attending in a hand hygiene training class during the last two years (P=0.296).

Investigating nursing employees' hand hygiene attitude showed that most of those who were participating in the study (71.3%) had an impartial or neutral attitude towards hand hygiene (Table 2). Less than half of subjects (42.9%) did not feel upset notifying other professional employees to wash their hands and (43.1%) believed that during the busy time of the ward, completing the duties is more important than doing hand hygiene.

Investigations regarding the relationship between demographic factors and attitude showed

that there was no statistically significant relationship between attitude and age range (P=0.051), education (P=0.818), ward of workplace (P=0.144), gender (P=0.853), work experience (P=0.326), working shift (P=0.070), and attending in a hand hygiene training class during the last two years (0.067).

A statistically significant and positive correlation (p < 0.001) between perception and attitude (r=0.519) has been also obtained (Table 3). □

DISCUSSION

The purpose of this study was to investigate hand hygiene knowledge, attitude and perception of nursing employees working in intensive care units (ICUs) of treatment educational centers of Iran University of Medical Sciences. Findings showed that about half of the nursing employees participating in the study had good knowledge about hand hygiene, despite some weaknesses in some questions. While all nursing employees had attended training classes in the last two years, 29.5% stated that they needed more training. Study results showed the need to provide more learning opportunities for nursing employees and the importance of implementing regular and continuous trainings, which could yield better individual knowledge. In this study there was no significant relationships between attending in hand hygiene training class in the last two years and the level of knowledge. Numerous factors, including individual, educational, and organizational factors, may affect the learning process that has not been investigated in

this study. The use of new and varied approaches, tailored to pedagogy that can enhance learning motivations, can lead to learning promotion.

Hand hygiene knowledge of most nurses participating in various studies was found to have a good level (10, 26, 27), a medium level (21, 28-30) but also a poor level (25, 31-33). In the study of Oh (34), the mean level of hand hygiene knowledge of nurses in infection control was reported to be 19.5 ± 2.3 , which was somewhat consistent with that of the present study (18.54 ± 2.48). The difference in knowledge-related results was due to the influence of numerous individual, educational and organizational factors on the learning process – e.g., differences between tools for measuring knowledge as well as assigning and rating scores (educational factors) or between nurses and assistants, with the former having a higher knowledge level than the latter.

The majority of nursing employees participating in the study acquired a high perception score. In the study of Oh, the mean score of hand hygiene perception of nurses in infection control was reported 69.9 ± 8.9 , which was different from that of the present study (63.07 ± 6.93). The variability of our findings is probably due to differences in age, cultural, educational, occupational, clinical experience and place of study. In the present study, it was specified that the perception of hand hygiene increased with age and working years.

Findings related to attitude showed that 102 (27.9%) subjects had a positive attitude, 261 (71.3%) a neutral attitude and three (0.8%) a negative attitude. Among studies on nurses' hand hygiene attitude, some have reported a positive attitude (10, 27), while others indicated a neutral (26) and negative attitude (25, 30, 32). The study of Oh revealed that nurses in infection control had a mean score of hand hygiene attitude of

46.9 ± 5.8 and a model-oriented score of 39.2 ± 6 , which were somewhat consistent with our findings (45.98 ± 4.39). Probably the difference in the obtained results is due to differences in age, culture, clinical experience, study location, occupational status, salaries, and policy making procedures.

The findings of the present research showed no statistically significant correlations between knowledge, perception and attitude of the selected sample of nursing employees, but highlighted a statistically significant positive correlation between subjects' perception and attitude, which is consistent with Oh's study. Therefore, it is very important to explore whether an increased perception can enhance the attitude and score of being a model. □

CONCLUSION

Structured, regular, and continuous training programs in various and effective methods should be further performed with increased accuracy and supervision in order to maintain and promote hand hygiene knowledge of nursing employees as well as reduce and eliminate knowledge deficit. It is also necessary to identify the factors involved in promoting a positive perception and attitude among nursing employees about hand hygiene. □

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