

# Hand Hygiene Knowledge, Practices and Attitudes among Nurses and Physicians

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## Abstract

**Background:** Hand hygiene is one of the most effective ways to control health care related infection. Nurses and physicians are the main health care workers contacting with patients, representing the vector in the chain of infection. Thus, assessing their knowledge, practice and attitudes regarding hand hygiene is very important to decrease the incidence of health care related infection and to improve quality of care. **Aims:** The aim is to assess the knowledge, practice and attitude of Palestinian physicians and nurses regarding hand hygiene in hospitals. **Methods:** The study adopted a cross-sectional, quantitative design. Nurses and doctors who worked in the major governmental and private hospitals in the West Bank (Palestine) were targeted. Data was collected using Hand Hygiene Questionnaire. **Results:** 200 nurses and physicians participated in this study. The results showed that the participants had a moderate knowledge regarding the hand hygiene ( $m = 6$ ,  $SD = 1.7$ ). They had a better attitude score than practice with a mean of  $82.5 \pm 8.8$ . There was a significant difference between male and female only in practice score ( $p = 0.015$ ). Older participants had better attitudes, and private hospitals had significantly higher scores for compliance, importance of hand hygiene and practice than governmental hospitals ( $p < 0.05$ ). **Conclusion:** The results of the current study showed that there was a further need to focus on the practices of hand hygiene by continuous education for both Palestinian nurses and physicians.

## Keywords

Health Care, Infection, Hand Hygiene, Palestine

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## 1. Introduction

Health care related infection (HCRI) in hospitals has resulted in many negative impacts on patients, families and

healthcare workers worldwide [1]. It represents a major burden around the world and affects the safety and quality of care for patients [2]. WHO ranks HCRI as one of the top ten causes of hospital deaths each year [3].

Patients, health care workers, and the environment are major reservoirs of health care related infection [1] [4]. The transmission of infection from patient to patient mainly occurs at the hand of health care workers [5] [6]. Patients' skin, mucous and any discharge can be colonized by many organisms, which will be transferred to surrounding surfaces and contaminate the environment in the hospital [7]. The hands of the health care workers will be contaminated through daily caring for patient or his environment, despite wearing gloves [8]. Therefore, hand hygiene (HH) is considered the most effective way to prevent cross-transmission of HCRI [6] [9]. Health care related infection is estimated to affect 10% of patients in developed countries, and 25% in developing countries [10]. Consequently, this will have a high impact on the quality of care, reflected in increased morbidity and mortality rates.

In the US, hospital patients contract two million infections per year, approximately one infection for every 25 patients [11]. These infections can be life-threatening and difficult to treat. Hand hygiene is considered one of the most simple but important ways to break the chain of infection [12]. Proper hand hygiene before and after each contact with any patient is an important measure to prevent HCRI [9] [11].

There are limited studies regarding HH in Palestine so far. Furthermore, there are no established and organized systems within the Ministry of Health (MOH) in Palestine for registering HCRI. Health care workers, especially nurses and physicians, have the most physical contact with patients, and thus they are the primary vector for infection transmission within hospitals.

Although HCRI is a major threat to patients' health and safety, it is highly preventable by proper HH [13]. Enhancing and promoting compliance of health care workers with HH is very important to prevent HCRI, and this needs to be based on baseline data by assessing the knowledge, practices and attitudes of Palestinian health care workers. Furthermore, studying and comparing knowledge, practices and attitudes regarding HH and the results may be used to reform and change the curricula for health sciences, as following the guidelines for proper HH may reduce HCRI by one-third [14]. Assessing the knowledge, practices and attitudes for physicians and nurses may also help in recognizing the factors that affect their compliance with HH, as it is still low [8].

Hand hygiene is an important aspect of the care provided to hospitalized patients [13]. Hand hygiene generally refers to hand washing with water and soap, or by using antiseptic solution or alcohol-based hand rubs [9]. Hand hygiene saves lives, so that it is very important to assess how much information or knowledge physicians and nurses have about HH [11]. Hand hygiene also is an effective and cost-efficient way to reduce the number of microorganisms, thereby reducing the rate of transfer of microorganisms to hospitalized patients and this will reduce the number of HCRI [15]. Therefore, the aim of this study was to assess the knowledge, practice and attitude of Palestinian physicians and nurses regarding HH in hospitals. More specifically, the objectives were to: (1) assess the levels of compliance, importance of HH, knowledge, practice, and attitudes of HH among Palestinian physicians and nurses; (2) compare between physicians and nurses regarding knowledge, practice, and attitude of HH; and (3) assess the differences across age groups, gender, and the experience regarding knowledge, practices and attitudes of HH.

## 2. Methods

### 2.1. Design and Settings

A cross-sectional, descriptive design was conducted in the major districts in governmental and private hospitals in the West Bank, Palestine. Data was collected from the participants using Hand Hygiene Questionnaire, which has been demonstrated to be a valid and reliable instrument [16].

### 2.2. Sample

All Palestinian nurses and physicians who worked in governmental and private hospitals represented the population of this study. A convenience sampling technique was used to recruit the participants. The convenience sampling is enrolled the most available individuals to participate in the study of interest [17]. This sampling method is the most common method used across different disciplines [18]. The required sample size was 176 participants (calculated by G power 3.0, power of 0.80, medium effect size and alpha of 0.05). A total of 225 questionnaires were distributed and 200 questionnaires were returned, indicating a high response rate of 89%. The other 11% did not answer the questionnaire or did not return it. The primary strategy was the drop-and-collect

technique. This technique involves the hand delivery and subsequent recovery of self-completion questionnaires [19]. This technique had many advantages, including a high response rate and saving time [20]. Additionally, the researcher dealt with the participants face-to-face and directly [19]. By adopting this technique, a clearer picture of the study for the participants was ensured.

### 2.3. Ethical Consideration

Ethical approval was sought and obtained from Birzeit University and permission was granted by the Palestinian MOH to conduct this study. Finally, permission was taken from ethical committees of each hospital prior to conducting fieldwork. Each package of the questionnaire had a title page with a full explanation about the study aims and expected outcomes, the nature of voluntary participation and the right to withdraw at any time, and the maintenance of confidentiality and privacy. Answering the questionnaires and returning them was considered to indicate consent.

### 2.4. Procedure

After obtaining ethical approval from the relevant ethical committees, potential participants were informed about the study and its related information. All eligible participants who agreed to participate in this study were asked to rate their knowledge, practice and attitudes regarding hand hygiene. Data collection was conducted by four undergraduate nursing students who were trained to maintain interrater reliability regarding data collection. The participants were informed that the data collector would be available in the selected wards to answer any questions, and the researchers' contact information was available to them. Data collection was undertaken from February to May 2015.

### 2.5. Measures

The Hand Hygiene Questionnaire [16] instrument was used to assess the knowledge, practice and attitude regarding hand hygiene. A demographic section was added to the questionnaire to elicit information on gender, discipline, age, type of hospital and experience. Hand hygiene questionnaire consists of three scales: knowledge, practice and attitude. The first scale contains 12 multiple-choice questions to assess hand hygiene knowledge. The practice and attitude scales were assessed via a five-point Likert-type rating system named the Hand Hygiene Practices Inventory (HHPI), which consists of 14 items, and the Hand Hygiene Beliefs Scale (HBS), which consists of 24 items. These Likert scales were summated multi-item scales. There were also certain questions regarding the importance of hand hygiene as perceived by the participants, measured subjectively on a scale from 1 to 10, and compliance with hand hygiene question, which was measured by a percentage. For the purposes of this study, some modifications were applied to the questionnaire in a way that did not affect its psychometric properties.

### 2.6. Analysis

Data was analyzed using SPSS version 19. A score of one was given for each correct answer and a score of zero was given for each wrong answer in knowledge score. The higher the score, the more knowledgeable the participant in relation to hand hygiene. Practices and attitudes means were calculated by adding the summated items: the higher the score, the better the practices and attitudes toward hand hygiene. Descriptive analysis was performed to describe the sample in terms of mean, standard deviation and range. Inferential statistics was performed to assess the difference between nurses and physicians, gender and hospitals regarding the compliance, importance of hand hygiene, knowledge, practice and attitude. As there was an increased risk of type 1 error in using consecutive t-tests, a MANOVA was performed to investigate discipline differences in knowledge, practice, attitude, compliance and importance of hand hygiene. Preliminary data screening were conducted. The scores were reasonably normally distributed. Moreover, linear relationships among pairs of dependent variables were noticed, with no extreme outliers, and no multicollinearity. Therefore, MANOVA was run across the analysis. Missing data was assessed and excluded from the analysis.

## 3. Results

### 3.1. Sample Characteristics

As shown in **Table 1**, a total of 200 subjects participated in this study, most of whom were male (74.5%,  $n =$

**Table 1.** Demographic characteristics of the sample.

Variable	N	%	M	SD	P <sub>50</sub>	Min	Max
Age	-	-	30.6	7.4	29	20	60
Gender:	149	74.5	-	-	-	-	-
Male							
Female	51	25.5					
Job:	57	28.5	-	-	-	-	-
Physicians							
Nurses	143	71.5					
YoE	-	-	7.3	6.8	6	1	36
CoE	142	71	-	-	-	-	-
Palestine							
Others	58	29					
Hospital	112	56	-	-	-	-	-
Governmental							
Private	88	44					

\*N = 200; \*YoE: Years of Experience, CoE: Country of Education.

149), while a quarter were female 25.5% (n = 51). The mean for age was  $30.6 \pm 7.4$ . As expected, nurses represented most of the sample 71.5% (n = 143) with 57% (n = 82) had a bachelor's degree in nursing, while physicians represented 28.5% (n = 57) of the sample. The mean for years of experience was  $7.3 \pm 6.8$ . The majority of the sample graduated from Palestinian universities and schools for both nurses and physicians (71%, n=142), while 29% (n = 58) graduated from outside universities. Regarding the hospitals, more than half of the sample were governmental employees (56%, n = 112), while private sector employees represent 44% of the final sample (n = 88).

### 3.2. Knowledge, Practice and Attitude

**Table 2** shows that more than half of the sample reported that they had received training about hand hygiene (57%, n = 114), compared with 43% (n = 86) who did not get any training. The mean for compliance in hand hygiene for the participants was  $80 \pm 14$ . The mean for importance of hand hygiene according to the participants' perceptions was  $9.2 \pm 1.4$ . In general, the sample has a moderate knowledge regarding the hand hygiene (m = 6, SD = 1.7). In relation to practice, the participants had a mean score of  $62 \pm 7$ . The sample has a better attitude score than practice with a mean of  $82.5 \pm 8.8$ .

### 3.3. Inferential Statistics

There were no statistically significant differences between nurses and physicians regarding importance of hand hygiene, compliance, knowledge, practice and attitude scores (**Table 3**). The same results were found when gender was assessed for these differences (**Table 4**). There was a significant difference between male and female only in practice (f = 5.98, p = 0.015). Regarding age, it was found that there were no statistically significant differences among age groups across compliance in hand hygiene, importance of hand hygiene, knowledge and practice, while attitude was statistically significant (f = 5.126, p = 0.002) and post hoc analysis showed that the older the nurses and physicians, the more diligent their practice toward hand hygiene.

In addition, it was found that there were statistically significant differences among groups of years of experience in compliance (f = 3.599, p = 0.015) and attitude score (f = 4.683, p = 0.003). Regarding the hospitals, it was found that there were significant differences between governmental and private hospitals in compliance (f = 7.092, p = 0.008), in perceived importance of hand hygiene (f = 4.596, p = 0.033) and in practice (f = 5.034, p = 0.027); the private hospitals had higher scores for all of these dimensions (**Table 5**).

## 4. Discussion

Hand hygiene is one of the most important measures to prevent HCRI. It is easy, simple and quick to implement,

**Table 2.** Descriptive characteristics of the knowledge, practice, attitude, compliance and importance of hand hygiene.

Variable	M	SD	P <sub>50</sub>	Min	Max
Compliance	80	15	80	10	100
IoHH	9.2	1.4	10	4	6
Kscore	6	1.7	6	0	10
Pscore	62	7	63	30	70
Ascore	82.5	8.8	82	54	121

\*N = 200; \*IoHH: Importance of Hand Hygiene, K score: knowledge score, P score: practice score, A score: attitude score.

**Table 3.** Differences in hand hygiene knowledge, practice, attitude, compliance and importance of hand hygiene scores by discipline (N = 200).

Variable	Discipline	Mean	F	P
IoHH	Physicians	9.17	0.001	0.98
	Nurses	9.18		
Compliance	Physicians	77.00	3.210	0.07
	Nurses	81.00		
Kscore	Physicians	6.12	0.572	0.45
	Nurses	5.91		
Pscore	Physicians	62.10	0.036	0.84
	Nurses	61.86		
Ascore	Physicians	83.10	0.339	0.56
	Nurses	82.26		

\*N = 200; \*IoHH: importance of hand hygiene, K score: knowledge score, P score: practice score, A score: attitude score.

**Table 4.** Differences in hand hygiene knowledge, practice, attitude, compliance and importance of hand hygiene scores by gender.

Variable	Discipline	Mean	F	P
IoHH	Male	9.07	3.65	0.06
	Female	9.50		
Compliance	Male	78.98	3.102	0.08
	Female	83.20		
Kscore	Male	5.90	1.307	0.25
	Female	6.22		
Pscore	Male	61.21	5.984	0.015
	Female	63.98		
Ascore	Male	81.78	3.852	0.051
	Female	84.56		

\*N = 200; \*IoHH: importance of hand hygiene, K score: knowledge score, P score: practice score, A score: attitude score.

**Table 5.** Differences in hand hygiene knowledge, practice, attitude, compliance and importance of hand hygiene scores by hospitals.

Variable	Discipline	Mean	F	P
IoHH	Governmental	9.00	4.596	0.03
	Private	9.41		
Compliance	Governmental	77.62	7.092	0.00
	Private	83.16		
Kscore	Governmental	5.92	0.256	0.61
	Private	6.05		
Pscore	Governmental	61.86	5.340	0.02
	Private	62.00		
Ascore	Governmental	82.54	0.008	0.93
	Private	82.43		

\*N = 200; \*IoHH: importance of hand hygiene, K score: knowledge score, P score: practice score, A score: attitude score.

but it has an immense impact on HCRI. In the current study, the sample has a moderate knowledge and practice of HH. In general, the sample has a better score on attitude compared to knowledge and practice of HH. These findings are consistent with previous work by [21]. These results are considered positive findings, especially as the study was conducted in a developing country (Palestine). Unexpectedly, compliance with HH was higher than in previous studies as the mean score was 80%, indicating encouraging rates compared with previous research [7].

Nurses and physicians had almost the same rated knowledge, practice and attitude regarding HH. Moreover, compliance and importance of HH had no significant differences between nurses and physicians. These results contradict the findings of most of the previous studies [16] [21]. Nair *et al.* [21] examined knowledge, attitude and practice of HH among medical and nursing students in India. They found that nursing students had more knowledge and compliance in HH than medical students ( $p < 0.05$ ). Similarly, Van de Mortel *et al.* [16] found that hand hygiene knowledge and practices were significantly higher in nursing students than among medical students.

In contrast, Abd Elaziz and Bakr [22] found that doctors showed a significantly higher compliance than other groups of health care workers. This could be due to that majority of both nurses and physicians graduated from Palestinian nursing and medical schools. This may make more similarities than discrepancies, even though physicians study for two more years than nurses. This could also reflect the knowledge-practice gap in nursing (whereby the theoretical knowledge of nursing students, which is generally superior for HH, gets lost in the translation into practice due to nursing overwork and other practice factors associated with nurses' intense patient interaction).

However, it was found that older participants (with more clinical experience) had better attitudes regarding HH. Conversely, Rajcevic *et al.* [7] found that health care workers under 40 years old had more knowledge and compliance regarding HH compared to their older peers. These contradictory results may be related to the differences in the undergraduate curriculum, which may have been reformed to focus more on the prevention of HCRI and HH. It may also be related to the accumulated experience and more courses among Palestinian nurses and physicians. The participants in the private sectors rated better compliance, importance of HH and practice than governmental sectors. This could be explained by availability of HH facilities and more continuous education regarding HH in the private sector.

Although the results of the current study showed that moderate knowledge, practice and attitude and high compliance were reported from the participants, future research should focus on overt and covert observational study to detect HH practice and attitude more closely, to detect more accurate information, as social desirability bias among the participants' answers could be an issue in this study. Also, investigating HH qualitatively is important to assess the limiting factors in attitudes, practices and compliance of HH. Descriptive design and convenience sampling are also limitations in this study. Further research is needed regarding HH in the clinical settings.

## 5. Conclusions

In conclusion, HH is very important to health care workers to control HCRI. It is important for both physicians and nurses and other healthcare workers to stick to and improve their practice, attitude and knowledge about this issue, which will play an important role in decreasing the cost of care for the patients and hospitals, contributing to shorter hospital stay, reducing mortality and morbidity rates and improving quality of care and of life for patients. This study shows that both Palestinian nurses and physicians have moderate knowledge, practice and attitude regarding HH. Chain of infection is a vicious circle that repeats itself, thus it is very important to break this chain by HH.

This study gives clues for clinical practice in relation to the HH. In spite of moderate results regarding knowledge, practice and attitude of HH, there is a need to improve the clinical daily routines for nurses and the doctors. The absence of significant differences between them in most of the study variables makes equal need for continuous education regarding HH for both Palestinian nurses and physicians. Furthermore, the significant differences between governmental and private hospitals regarding compliance and practice draws attention toward the availability of HH facilities in the former.

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