Predictors of compliance handwashing practice among healthcare professionals

**Mahmoud Al-Hussami**1,3 DSc, PhD

**Muhammad Darawad** RN, PhD

**Iyad I. Almhairat** RN, IPCP

1Faculty of Nursing, University of Jordan, Amman 11942, Jordan.
2Al-Basheer Hospital, Amman, Jordan.
3Corresponding author. Email: m.alhussami@ju.edu.jo

**Abstract.** Background: Handwashing compliance among healthcare professionals is the most important recommended practice to combat hospital-associated infections. However, compliance rates with handwashing practices remain low, particularly among physicians.

Objectives: The purpose of this study was to determine the application status of handwashing information given within the context of infection control measures in practice areas; and also to determine the need for inclusion of more in-depth information about handwashing and identifying the predictors for handwashing compliance in relation to knowledge, behaviour, beliefs, and attitude by healthcare professionals.

Methods: This study was a cross-sectional survey. The target population was all healthcare professionals, including physicians, nurses and technicians, working in large acute-care hospitals in Amman, Jordan. However, medical and nursing students were excluded.

Results: The results showed a predictive model of five predictors which were significantly related to self-reported handwashing: beliefs about outcomes, attitude, referent beliefs, control beliefs and skin assessment. These factors have a comparable power in the prediction of self-reported handwashing. Attitude, control beliefs and skin assessment had relatively higher prediction effects ($B = 0.406$, $P < 0.001$), ($B = 0.296$, $P < 0.000$), ($B = 0.523$, $P < 0.000$), respectively, compared with intention ($B = –0.233$, $P = 0.102$) and years of experience ($B = –0.078$, $P = 0.576$).

Conclusion: The results of this study have important implications for improving healthcare professionals’ compliance with handwashing through continuous education for those providers to reinforce and educate them about the concepts of universal precautions and guidelines of infection control.

Additional keywords: compliance, handwashing, skin assessment, attitude.

**Background**

Handwashing is considered to be the most important recommended practice to combat hospital-associated infections. It refers to the professional practice of cleaning hands, with reduction in infection rates reported after improved compliance with handwashing. It is now recognised as the ‘do-it-yourself’ that all healthcare professionals are encouraged to perform due to its ability to interrupt the transmission of infectious disease pathogens.

Although the Centers for Disease Control state that handwashing is the most important approach in preventing hospital-associated infections, handwashing compliance rates among healthcare professionals are very low. The reasons behind these low rates include: the lack of practising handwashing as a behavioural pattern by healthcare professionals; decreased interest in their practical applications with increased educational status; heavy workload; lack of sufficient sinks for handwashing in clinical areas; and lack of knowledge of healthcare professionals regarding handwashing. These low compliance rates have been addressed by many behavioural theories, but the success of management to improve adherence to handwashing among healthcare professionals has been limited.

Compliance with handwashing is an absolute need, and with increasing numbers in adherence with handwashing among healthcare professionals due to effective training and education programs, have made healthcare settings pay some attention to facilitate and support handwashing educational programs. Caring for and paying some attention to skin care and condition by healthcare professionals as result of using hand hygiene products are very important for compliance with hand hygiene guidelines.

Handwashing is poor among healthcare professionals. There are numerous research articles describing how hospital workers fail to wash their hands as thorough or as frequently as they should. Previous studies on handwashing showed that these studies have primarily been conducted among nurses, doctors and nursing students. However, little is known about hand washing among healthcare professionals as a single team. This study aims to determine the application status of handwashing information given within the context of infection control measures in practice.
areas, to determine the need for inclusion of more in-depth information about handwashing, and to identify the strongest predictor for handwashing compliance in relation to knowledge, behaviours, beliefs and attitudes of the healthcare professionals.

Research questions
1. What is the handwashing compliance rate among the Jordanian healthcare professionals in governmental hospitals?
2. What are the multiple correlations between the predictors (beliefs about outcomes, attitude, referent beliefs, intention, control beliefs and skin assessment) and healthcare professionals’ self-reported handwashing compliance?
3. Which is the strongest predictor of healthcare professionals’ self-reported handwashing, beliefs about outcomes, attitude, intention, control beliefs, skin assessment, referent beliefs or years of experience?

Design
This study was a cross-sectional descriptive correlational survey. The target population was all health care professionals; including physicians, registered nurses and laboratory technicians, working in a large acute-care hospital in Amman, Jordan. However, medical and nursing students were excluded from participation in the study.

The estimated sample size
Based on previous literature that examined handwashing among healthcare professionals, a conservative effect size of 0.15 was estimated using the statistical software G*Power V.3.21 Therefore, with a statistical power of 0.95, effect size 0.15, and a statistical significance of 0.05, the estimated sample size needed to perform simple linear multiple regression was 160 subjects.

Population and sample
The population targeted for this study included all healthcare professionals (physicians, registered nurses and laboratory technicians) employed at a governmental acute-care hospital in Amman, Jordan. The hospital is a 930-bed fully-fledged public sanatorium located in a low-income and densely populated area. The hospital has a total number of 1742 healthcare professionals who aim to social equity through treating poor and uninsured people.22

A stratified random sample of 400 healthcare professionals was selected from 18 hospital departments. The sample was selected using a random table of numbers based on the last three digits of the employee’s identification number to create representative groups, including physicians, registered nurses and laboratory technicians. Each of the aforementioned groups was selected due to their high volume of contact with patients and their blood or body fluids.

Ethical approval
This study was conducted with consideration of the ethical implication at each phase of the study process. Approval from the Scientific and Ethical Research Committee at the targeted hospital was obtained before starting data collection. Following their approval, each participant was asked to sign a written consent form before participating in the study, which clarifies the study’s purposes and participant’s rights. Confidentiality of the respondents was ensured throughout the study. Data were secured correctly, saved in the principal researcher’s -rotected computer, with hard copies in a closed cabinet in a locked office. Moreover, the demographic data sheets were coded by numbers with no names, to maintain confidentiality, and no one except the investigator had access to that data. Respondents were advised that participation in the study was voluntary, and that they could withdraw from the study at anytime without any consequences.

Instrumentation – measurement of variables
The instrument selected for use in this study was the Hand Washing Assessment Inventory (HAI), which was developed by O’Boyle et al.16 The HAI is a self-administered instrument that measures five aspects (subscales) of motivation for handwashing: beliefs about outcomes, attitude, referent beliefs, control beliefs, intention, as well as self-reported handwashing compliance. Demographic data were collected through a special sheet, including age, gender, marital status, educational level, years of experience, unit of experience and yearly income.

The beliefs about outcomes of handwashing represent the cognitive evaluation of the consequences of handwashing. This subscale has 14 items addressing transmission of micro-organisms, comfort of the professionals and professionals’ behaviours. Respondents used a 7-point Likert scale (extremely unlikely to extremely likely) to rate their perception of the likelihood with which each outcome would occur if the procedures for handwashing were followed regularly.

The subscale of attitude toward handwashing represents affective/cognitive evaluation of the handwashing procedure itself. This subscale has eight items addressing different attitudes (e.g. necessity, reassurance, convenience) using a 7-item Likert scale (extremely unlikely to extremely likely) to rate their attitudes.

The referent beliefs subscale measures healthcare professionals’ expectations regarding what people (e.g. managers, colleagues) hold for the professionals’ handwashing behaviours. This subscale uses a 7-item Likert scale with ‘1’ indicating that other people are extremely unlikely to believe that the professional should comply with hand washing, and ‘7’ indicating extremely likely.

The control beliefs subscale measures the degree to which a health professional believes that he/she holds access to assets required to adhere to handwashing recommendations in various patient-care circumstances. This subscale has four items concerning aspects that include personal knowledge about handwashing, attributes of the circumstance and the unit context, measured by a 7-item Likert scale ranging from extremely unlikely to extremely likely.

The intention subscale contains five items concerning health professionals’ desires to comply with handwashing guidelines.
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in various clinical circumstances (e.g. infectious cases, acute cases, ulcerated hands), using a 7-item Likert scale ranging from extremely unlikely to extremely likely. Also, skin assessment was measured using a 4-item subscale that contained skin condition, appearance, turgor and sensation, which asked participants to rate the condition of the skin on a 7-item Likert scale ranging from unhealthy to healthy skin.

Finally, the self-reported hand washing subscale asked participants to rate the percentage of their compliance to handwashing (from 0% to 100%) in nine different circumstances (e.g. before starting patient care, between patients, after removing gloves and after procedures).

O’Boyle and colleagues [16] reported an estimated Cronbach’s α of 0.91 for the attitude subscale, 0.89 for the referent beliefs subscale, 0.85 for the control beliefs subscale, 0.74 for the intention subscale and 0.87 for the self-reported handwashing subscale.

The pilot test was conducted using a sample of 50 healthcare professionals. Participants in this sample were individuals who were not selected to participate in the study. All 50 pilot questionnaires were returned. The results from the pilot test indicated that the coefficient (Cronbach’s α) was reliable at 0.75 for the attitude subscale, 0.73 for the referent beliefs subscale, 0.79 for the control beliefs subscale, 0.77 for the intention subscale, 0.71 for beliefs about outcomes and 0.90 for the self-reported handwashing subscale. Based on the positive responses from respondents who participated in the pilot test, no adjustments on the instrument were needed.

Data collection and procedures

Data collection took place over 4 months during the period of July 2010 to October 2010. Researchers met the heads of the participating units and departments to explain the purposes of the study. Then, researchers held a meeting with the subjects and invited them to voluntarily participate in the study. Those who accepted participation were handed the survey packets enclosed in sealed envelopes. To ensure a high response rate, researchers held a meeting with the subjects to take them home. The assurance of anonymity and the aforementioned information was explained to the participants in a cover letter included in the survey packet with the questionnaire.

Results

A total number of 400 questionnaires were distributed among healthcare professionals employed at a governmental hospital in Amman. Three hundred and forty-nine participants completed the questionnaire with a response rate of 87.3%. Thirteen participants were excluded as they had high school degrees only, had no degree in nursing, and they were not allowed to provide direct nursing care, and 38 subjects who met the inclusion criteria did not return the questionnaires. Data were entered into SPSS (SPSS Inc., Chicago, IL, US), coded and organised. Different items were clustered and calculated together to formulate total scores of the following variables: self-reported handwashing, attitude, referent beliefs, control beliefs, perceived control and intention. Self-reported handwashing was the principal dependent variable within different analytic procedures performed.

The study sample (n = 349) consisted primarily of 35% (n = 122) 36-year-old healthcare professionals, where 60% (n = 210) were female. According to demographic data in Table 1, the majority of participants were married (70%), registered nurses (77%) and had 1–5 years of experience (68%). Overall, the mean of participants’ handwashing compliance rate was 63.8% and nurses showed the greatest rate (66%) compared to other professionals (Table 1).

Healthcare professionals’ characteristics were examined in relation to self-reported handwashing scores using one way analysis of variance (ANOVA) and Student’s t-tests. Mann–Whitney U-test and Kruskal–Wallis test were used as ANOVA and t-test assumptions were violated in terms of significant Levene’s test of homogeneity of variance. While only the healthcare professionals’ age and their years of experience were extremely significant, participants’ unit of experience, gender, education and marital status had no influence on professionals’ handwashing compliance. Age was crucial as it is extremely significant ($\chi^2 = 16.2$, d.f. = 3, $P < 0.001$) in relation to healthcare professionals’ self-reported hand washing scores between different healthcare professionals’ age groups as shown in Table 2. In addition, years of experience was evident statistically among healthcare professionals’ handwashing compliance ($F = 5.20$, d.f. = 3, $P = 0.002$) (Table 2). These results suggest that age and experience are positively correlated with the self-reported handwashing.

Pearson’s correlation coefficient test was performed to examine the relationships between self-reported handwashing, beliefs about outcomes, attitude, intention, control beliefs and skin assessment. A relatively high significant correlation emphasises the importance of understanding motivation-related variables such as beliefs about outcomes, attitude, intention, control beliefs and skin assessment. Control beliefs and skin assessment had higher correlation ($r = 0.45$, $r = 0.44$, respectively) with self-reported handwashing compared with other recorded variables. On the other hand, control beliefs had higher correlation ($r = 0.67$) with intention rather than self-reported handwashing ($r = 0.45$). A relatively higher correlation was observed among skin assessment in relation to control beliefs and intention ($r = 0.349$, $r = 0.348$, respectively) compared with other variables (Table 3).

The third question in this study was concerned with what is the strongest predictor of health care professionals’ self-reported handwashing: beliefs about outcomes, attitude, intention, control beliefs, skin assessment, referent beliefs, or years of experience? To answer this question, stepwise linear regression analysis was used to estimate the probability of recorded variables, including significant sample
Handwashing compliance rate: 63.8%

Educational level: 
- Years of experience: 1
- Marital status: 
  - Age: 18
  - Gender: 
    - Gender: 
      - Variables Range % (n)
        - Profession: Technician 59% (39)
          - MD 12% (42)
          - RN 66% (238)
          - MARITAL STATUS: Single 30% (104)
            - Divorced 2% (7)
            - Married 68% (238)
            - Gender: Female 60% (210)
              - Male 40% (139)
              - Years of experience: 1–27 years
                - 1–5 years: 68% (238)
                - 6–10 years: 11% (38)
                - 11–20 years: 8% (28)
                - >20 years: 13% (45)

Table 1. Description of demographic variables of the study sample (n = 349)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>40% (139)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>60% (210)</td>
</tr>
<tr>
<td>Age:</td>
<td>18–55 years</td>
<td></td>
</tr>
<tr>
<td>22–28 years</td>
<td>23% (80)</td>
<td></td>
</tr>
<tr>
<td>29–35 years</td>
<td>26% (91)</td>
<td></td>
</tr>
<tr>
<td>36–45 years</td>
<td>35% (122)</td>
<td></td>
</tr>
<tr>
<td>≥46 years</td>
<td>16% (56)</td>
<td></td>
</tr>
<tr>
<td>Marital status:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td></td>
<td>30% (104)</td>
</tr>
<tr>
<td>Married</td>
<td></td>
<td>68% (238)</td>
</tr>
<tr>
<td>Divorced</td>
<td></td>
<td>2% (7)</td>
</tr>
<tr>
<td>Years of experience:</td>
<td>1–27 years</td>
<td></td>
</tr>
<tr>
<td>1–5 years</td>
<td>68% (238)</td>
<td></td>
</tr>
<tr>
<td>6–10 years</td>
<td>11% (38)</td>
<td></td>
</tr>
<tr>
<td>11–20 years</td>
<td>8% (28)</td>
<td></td>
</tr>
<tr>
<td>&gt;20 years</td>
<td>13% (45)</td>
<td></td>
</tr>
<tr>
<td>Educational level:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MD</td>
<td></td>
<td>12% (42)</td>
</tr>
<tr>
<td>RN</td>
<td></td>
<td>77% (268)</td>
</tr>
<tr>
<td>Technician</td>
<td></td>
<td>11% (39)</td>
</tr>
<tr>
<td>Handwashing compliance rate:</td>
<td>63.8</td>
<td></td>
</tr>
<tr>
<td>MD</td>
<td></td>
<td>54%</td>
</tr>
<tr>
<td>RN</td>
<td></td>
<td>66%</td>
</tr>
<tr>
<td>Technician</td>
<td></td>
<td>59%</td>
</tr>
</tbody>
</table>

Table 2. Demographic effects on self handwashing (n = 349)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (s.d.)</th>
<th>df</th>
<th>$\chi^2$</th>
<th>$t$</th>
<th>$F$</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearly income</td>
<td>1.755</td>
<td>3</td>
<td>0.080*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit</td>
<td>1.002</td>
<td>3</td>
<td>0.001*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>19.47</td>
<td>3</td>
<td>&lt;0.001*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of experience</td>
<td>5.20</td>
<td>3</td>
<td>0.002*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>0.758</td>
<td>2</td>
<td>0.471*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profession</td>
<td>-1.86</td>
<td>1</td>
<td>0.065*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*aSignificant at $\alpha = 0.05$ (2-tailed).
*1-way ANOVA; t-test; Mann–Whitney U-test; Kruskal–Wallis test.

Table 3. Pearson correlations of self-reported handwashing and predictors (n = 349)

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Self-reported handwashing</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Beliefs about outcomes</td>
<td>0.379**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Attitude</td>
<td>0.357**</td>
<td>0.582**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Referent beliefs</td>
<td>0.226**</td>
<td>0.116*</td>
<td>0.414**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Intention</td>
<td>0.357**</td>
<td>0.137*</td>
<td>0.131*</td>
<td>0.430**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Control beliefs</td>
<td>0.450**</td>
<td>0.117*</td>
<td>0.265**</td>
<td>0.253**</td>
<td>0.678**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>7. Skin assessment</td>
<td>0.440**</td>
<td>0.035</td>
<td>0.145**</td>
<td>0.222**</td>
<td>0.349**</td>
<td>0.348**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Correlation is significant at $\alpha = 0.05$ (2-tailed); **Correlation is significant at $\alpha = 0.01$ (2-tailed).

Characteristics, namely, age and years of experience. Seven variables were entered in the linear regression analysis, which consisted of a 4-step model with no missing cases on an entry level of $\alpha = 0.05$ and removal at 0.1. As shown in Table 4, the outcome showed a predictive model of five predictors, which were significantly related to self-reported handwashing: beliefs about outcomes, attitude, referent beliefs, control beliefs, and skin assessment. These factors have a comparable power in the prediction of self-reported handwashing. Attitude ($\beta = 0.406$, $P < 0.001$) and control beliefs ($\beta = 0.296$, $P < 0.000$) had relatively higher prediction effects, while skin assessment was the strongest predictor ($\beta = 0.523$, $P < 0.000$), compared with beliefs about outcomes ($\beta = 0.338$, $P = 0.008$) and referent beliefs ($\beta = -0.270$, $P = 0.008$) (Table 4). As a result, intention ($\beta = -0.233$, $P = 0.102$) and years of experience ($\beta = -0.078$, $P = 0.576$) were not able to predict self-reported handwashing among healthcare professionals.

Discussion

This descriptive study reports Jordanian healthcare professionals’ self-reported handwashing frequency (compliance), along with its predictors as perceived by those healthcare professionals within different hospital settings. Of concern is the finding that participants’ self-reported handwashing compliance rate was 63.8%, which is higher than that reported among American hemodialysis staff who reported compliance rates between 46.7 and 57.4%3 but less than the compliance rate of 86.6% reported by nurses in Hong Kong,24 and less than the compliance rate of 80.2% reported by Turkish nursing students.17 In comparing participants’ compliance rates reported in this study with the literature that emphasised the importance of performing handwashing before and after patient contact, before procedures that are invasive, or those in contact with wounds and body secretions,25 the reported compliance rate is considered low.

Detailed analysis for the items of frequency of handwashing revealed that the items of the highest frequency were ‘after contact with patients’ secretions and instruments’ and ‘after finishing providing care to the patient’, whereas the items of the lowest frequency were ‘before providing nursing care to the patient’ and ‘while providing care between the patient and another’. These results indicate that healthcare professionals perceived the threat of contacting patients or their secretions, and that they comply with handwashing, trying to protect them. However, when it comes to protecting patients, they were less compliant. Many reasons can be suggested for this, including the heavy workload they might have, the lack of handwashing resources, or the ineffectiveness of the available resources.

It is notable that participants’ ages and years of experience were the only demographics to have significant positive
Table 4. Stepwise linear regression analysis of predictors of self-reported handwashing (n = 349)

<table>
<thead>
<tr>
<th>Variables</th>
<th>β</th>
<th>SE</th>
<th>β</th>
<th>t</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beliefs about outcomes</td>
<td>-0.338</td>
<td>0.100</td>
<td>-0.215</td>
<td>-0.36</td>
<td>0.001**</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.406</td>
<td>0.084</td>
<td>0.323</td>
<td>4.80</td>
<td>0.000**</td>
</tr>
<tr>
<td>Referent beliefs</td>
<td>-0.270</td>
<td>0.101</td>
<td>-0.228</td>
<td>-2.68</td>
<td>0.008*</td>
</tr>
<tr>
<td>Intention</td>
<td>-0.233</td>
<td>0.142</td>
<td>-0.169</td>
<td>-1.63</td>
<td>0.102</td>
</tr>
<tr>
<td>Control beliefs</td>
<td>0.296</td>
<td>0.070</td>
<td>0.713</td>
<td>4.24</td>
<td>0.000**</td>
</tr>
<tr>
<td>Skin assessment</td>
<td>0.523</td>
<td>0.079</td>
<td>0.329</td>
<td>6.62</td>
<td>0.000**</td>
</tr>
<tr>
<td>Years of experience</td>
<td>-0.078</td>
<td>0.140</td>
<td>-0.046</td>
<td>-0.560</td>
<td>0.576</td>
</tr>
</tbody>
</table>

*Predictors of self-reported handwashing final model produced at α = 0.05, F = 52.4, P > 0.001, R² = 0.642.

**Correlation is significant at α = 0.01 (2-tailed).

relationship with handwashing compliance. These two demographics were among the demographics found by Chan and colleagues to have significant relationship with handwashing compliance. Surprisingly, work title did not have any relationship with the frequency of handwashing, which is against the findings of another Jordanian study that found significant differences between dentists and dental nurses in terms of compliance to handwashing.

The relatively high significant correlation between self-reported handwashing compliance and the five proposed motivation factors was of special concern, which emphasises the importance of understanding such factors. Control beliefs had the highest correlation with handwashing compliance, which points out to the need to enable healthcare professionals to access more resources that are required to adhere to the universal precautions of handwashing. The same result was found by Harris and colleagues who reported the availability of sinks as a factor that can increase healthcare professionals’ handwashing compliance. This supports the recommendations for the need to supply healthcare professionals with more resources (such as alcohol-based hand rubs) that can enhance their handwashing compliance and save time during their duties.

Skin assessment had the second highest correlation with healthcare professionals’ handwashing compliance, which seems to be a universal factor as it was the same among healthcare professionals in Denmark and Norway, the USA and Italy. Concurrently, skin assessment had the highest prediction value for healthcare professionals’ handwashing compliance, which highlights the significance of choosing the resources that can convince healthcare professionals that handwashing will not affect their hands in terms of side-effects such as dryness and skin irritation. However, alcohol gel and emollients can be used to overcome these problems as they have been proven to save time and to have satisfactory antimicrobial effects. In Jordan, the use of such products needs to be encouraged as they are not sufficiently used.

Implications

The results of this study have important implications for improving healthcare professionals’ compliance with handwashing through continuous education to reinforce and educate them about the concepts of universal precautions and guidelines of infection control. Convincing nurses and other healthcare professionals about the importance of handwashing is the best way to increase their handwashing compliance. The authors strongly support the recommendation of Chan and colleagues who suggested the compulsory integration of universal precautions guidelines as part of refresher or training programs for all healthcare professionals. Conducting post-education surveys to observe their compliance with handwashing is also advisable to determine the effectiveness of such programs.

Also, it is recommended to visit medical and nursing students’ training curricula and revise their content to incorporate guidelines regarding universal precautions and infection control. The authors agree that those students have significant impact on hospital infection rates, and believe that working on students through enhancing their knowledge of universal precautions and infection control guidelines would have great influence on their future handwashing compliance rates. Within this stream, the authors suggested including medical and nursing students in future research studies of infection control guidelines and handwashing compliance.

According to occupational safety and health regulations, hospital administrations and nursing officers have the responsibility to have handwashing resources (sinks, soap or the alcohol-based rub) which are easy to use, comfortable with fewer side-effects, and accessible for all healthcare professionals. At the same time, they have the responsibility to monitor their compliance with handwashing and be assertive with those who do not comply with the guidelines.

Limitations of this study must be weighed against its strengths. This study made a great contribution to nursing in Jordan through being the first to consider such an important topic for nurses. This study provides baseline information related to Jordanian healthcare professionals’ compliance with handwashing. The use of a relatively large sample size and including many hospital units has positively influenced the validity of the results. However, including only one hospital from one health sector in Jordan and self-reported handwashing over structured observation are considered limitations for this study. Future studies are suggested to include many hospitals from different healthcare sectors to compare handwashing compliance rates between the sectors. Also, this study did not include workload as a variable that might have an effect on handwashing compliance rates. The authors of this study recommend a larger study that investigates handwashing compliance rates among all healthcare professionals, taking into consideration the workload of each group.

Conclusion

This study attempted to assess Jordanian healthcare professionals’ handwashing compliance rates, and to explore factors that could affect their compliance. Five factors were found to have relationships with handwashing compliance, among which skin assessment had the highest predictive
value. This study makes a great contribution for improving compliance of healthcare professionals in Jordan with the required handwashing protocols through highlighting the need to improve their knowledge regarding handwashing, and through providing them with the required resources to help them comply with universal infection control precautions, including handwashing.

Acknowledgements
The authors express their appreciation to all MDs, RNs and laboratory technicians who participated in this study. Also thanks are extended to the Al-Basheer Hospital Administrator for giving permission to undertake the study.

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Manuscript received 7 February 2011, accepted 5 April 2011

http://www.publish.csiro.au/journals/hi