Knowledge, Beliefs and Self-reported Practices of Hand Hygiene among Egyptian Medical Students: Does Gender Difference Play a Role?

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ABSTRACT

Background: Hand hygiene (HH) is the most cost-effective and practical measure to reduce the healthcare-associated infections (HAIs). This study aimed to assess medical students' knowledge, beliefs and practices of HH and to shed light on the effect of gender.

Methods: A descriptive comparative study was conducted during August 2016 on a convenient sample of 285 senior medical students. Knowledge, beliefs and practices of HH were compared between males and females medical students using the English version of the Hand Hygiene Questionnaire (HHQ).

Results: The mean age of participating students was 24.8±0.97. Males represented 55.8% of the sample. Females had significantly better knowledge on HH than males (p <0.001). Females also had significantly better practice and positive belief towards HH than males.

Conclusions: Gender differences can be observed in knowledge, belief, and practice of HH among medical students. Female had better knowledge and self-reported practice than male students. Emphasizing the importance of HH in education and assessment, particularly in the clinical settings will help to facilitate a more encouraging culture towards HH. The gender differences highlighted in this study call for educational interventions to improve HH. The interventions have to be targeted and gender-specific to meet the demands of the students. A nationwide study of a bigger sample covering all medical faculties in Egypt should be undertaken to confirm these results.


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INTRODUCTION

Washing hands with soap and water is part of personal hygiene for different age groups [1], and our parents, teachers, health professionals, and peers introduce us to the hand washing concept [2]. Although proper hand hygiene (HH) is a well-established norm, maintaining good hand hygiene is considered a major challenge in infection control [3]. HH is an important healthcare issue globally and is a single most cost-effective and practical measure to reduce the incidence of healthcare-associated infections (HAIs) as well as the spread of antimicrobial resistance across all healthcare settings [4]. HAIs can lead to increase morbidity, mortality and healthcare costs. Adherence to HH guidelines can reduce infection rates and healthcare costs [5].

Many studies indicate that healthcare workers’ (HCW) adherence to HH guidelines is poor [6] in spite of this being a simple procedure to follow. Much research has been done on factors that influence HCWs’ HH compliance, however, comparatively little attention has been paid to healthcare students’ HH knowledge, beliefs and practices, and how they are educated and trained on HH [7]. Snow et al [8] reported that the knowledge acquired during undergraduate education, and students’ perceptions of the importance placed on HH in their practice through repeated episodes of education and assessment, and through the role models, may influence their practices. Furthermore, the authors also reported that the medical students had a low overall rate of HH and the observed HH compliance was substantially lower than their self-reported compliance. It was also found that HH compliance is higher in situations where the students feel at risk, than in situations where unclean hands put the patients at risk [9]. Also, it was suggested that HH behavior among HCWs is largely motivated by self-protection rather than the protection of others [10,11].

To the best of our knowledge, there is poor HH practice (HP) among medical students who will be the future physicians, with limited studies addressing the gender effect on HH. So, we conducted this study aiming to assess knowledge, beliefs and practices of HH among a sample of Egyptian medical students, focusing on the role of gender differences.

MATERIALS AND METHODS

Study Design and Setting

A descriptive comparative study was conducted during August 2016 on senior medical students at Mansoura University, Egypt. Completed self-reported questionnaires were used to gather information. The students were allowed to respond in their own time and in privacy. Non-participation was due to lack of interest in the study, absence during the study period and incomplete questionnaires.

Study Participants

The study participants were convenience samples of undergraduate senior medical students, 159 males and 126 females, in the final year of their degree. In Mansoura medical school, the regular undergraduate medical curriculum is six years with the 4th to 6th years consisting of clinical training along with didactic courses. Senior students were specifically selected as they are more likely be exposed to the full breadth of the curriculum.

Study Tools

Knowledge, beliefs and practices of medical students regarding HH were assessed using the English version of the Hand Hygiene Questionnaire (HHQ). The HHQ is a self-reported questionnaire that was originally developed and validated by van de Mortel [7] who described the theoretical framework of the tool. Cronbach alpha values of 0.80, 0.74 and 0.77 were obtained for the Hand Hygiene Beliefs Scale (HBS), the Hand Hygiene Practices Inventory (HHPI), and the Hand Hygiene Importance Scale (HIS). The two-week test-retest coefficients for each scale were 0.85, 0.79 and 0.89, respectively. The questionnaire demonstrated an adequate validity and reliability when applied on a wider sample of healthcare students of different disciplines from 20 universities in Australia, Sweden, Greece and Italy [9].
The HHQ used in this study was a comprehensive block of the following instruments: First, the instrument inquired about socio-demographic data such as age and gender. Second, the instrument tested HH knowledge by 12 multiple choice questions based on the CDC’s HH guidelines. For each correct response, the respondent received one point. The sum total resulted in the respondent’s knowledge score on a scale of zero to 12.

Third, the self-reported practices to HH were explored via the HHPI that contained 14 items assessed on a Likert scale from one to five indicating how often the students encounter the item: 1 (never); 2 (some of the time); 3 (half of the time); 4 (mostly); 5 (always). In addition, the respondents were asked to assign the percentage of HH compliance in the healthcare setting. Fourth, HH beliefs were tested by the HBS that included 19 items focused on students’ perceptions of barriers and rewards for hand washing. Participants were asked to respond on a 5-point Likert scale that differentiates their HH beliefs as: 1 (strongly disagree); 2 (disagree); 3 (not sure); 4 (agree); 5 (strongly agree). Finally, HIS was used that contained three items for assessment of students’ perceptions to the importance given for HH in the curriculum by their supervisors and in healthcare facilities. The responses were measured on a 5-point Likert scale that ranged from strongly disagree to strongly agree as in HBS. The students were also asked to rate the importance of HH as an infection controls measure on a scale from 1-10, where 1 was least important and 10 was the most important.

Ethical Considerations

Ethical approval was obtained from the Institution Research Board (IRB) of Mansoura University. After obtaining the approval, the students were informed about aim of the study, guarantees of anonymity and confidentiality and the need for verbal consent. The participation was entirely on voluntary basis and didn’t affect the final graduation score.

Statistical Analyses

Data were analyzed by SPSS version 16. Descriptive statistics was presented as numbers, percents, mean ±SD and range. The outcome of HH Knowledge score was dichotomized into Poor (0-5) and Good (6-12) based on the highest minimum score in our study which was five. Chi-squared and Student’s t-tests were used to assess gender differences. Significance was assumed for a p-value of ≤0.05.

RESULTS

The mean age of participating students was 24.8±0.97. Males (n=159) represented 55.8% of the sample, while females (n=126) were 44.2%. Female students had significantly higher mean score of HH knowledge than males (7.60±1.66 vs. 5.33±1.99, respectively). Good knowledge was significantly higher among the female students with p<0.001 as shown in Table 1.

Table 2 shows gender differences in HHP of medical students. Female students had a higher statistically significant rate of HHP than males especially after: going to toilet (87% vs. 63%), caring for a wound (91.6% vs. 80.5%), contact with blood or body fluids (97.2% vs. 90.6%), contact with a patient (27.1% vs. 12.4%), exiting an isolation room (20.3% vs. 11.9%), contact with patient secretions (94.6% vs. 77.5%), and if felt that their hands were dirty (90.7% vs. 70.5%), respectively.

Tables 3 and 4 portray items of the HBS and HIS, respectively. Regarding the belief scale, female students believed that they act as a role model for other HCWs, HH was a habit in their personal life, they were confident they can effectively apply their knowledge of HH to clinical practice, they would feel uncomfortable reminding a health professional to wash hands and performing HH slows down building immunity to disease with statistically significant differences. As regards the importance scale, there was only statistically higher significant difference among females in reporting that the facilities in which they do clinical practicum emphasize the importance of HH.

DISCUSSION

Hand hygiene is a key in preventing transmission of infectious pathogens on the
hands. Although proper hand washing is considered a well-established social norm, maintaining good HH is a major challenge in infection control. This study was conducted to determine the gender differences on knowledge, beliefs, practices, and importance of HH among Egyptian medical students. The mean knowledge score reported in this study is similar to that reported by Van de Mortel [12]. The mean score of HH knowledge in this study could be described as fair or moderate among both genders. This agreed with Nair [13] in India and
Cruz [14] in Saudi Arabia, however, females were significantly more knowledgeable than males. The better HH knowledge among the female students in this study doesn’t conform to Ergin et al [15] in Turkey who reported higher mean knowledge score among males. Moreover, another study revealed that the overall score in knowledge did not differ between male and female students [16]. Similarly, another study from Saudi Arabia showed that there was no significant difference in the awareness to HH between both genders of medical students [17]. This finding may be due to sampling variability. On the other hand, Anderson [18] and White et al [19] reported better HH in females than in males. The relative low scores related to

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Males n (%)</th>
<th>Females n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have a duty to act as a role model for other healthcare workers</td>
<td>11 (7.2)</td>
<td>70 (55.6)</td>
<td>0.000*</td>
</tr>
<tr>
<td>2. When busy it is more important to complete my tasks than to perform HH</td>
<td>106 (66.8)</td>
<td>74 (59.1)</td>
<td>0.168</td>
</tr>
<tr>
<td>3. Performing HH in the recommended situations can reduce patient mortality</td>
<td>121 (76.1)</td>
<td>110 (87.3)</td>
<td>0.017*</td>
</tr>
<tr>
<td>4. Performing HH in the recommended situations can reduce medical costs associated with HAI</td>
<td>61 (38.1)</td>
<td>69 (54.8)</td>
<td>0.006*</td>
</tr>
<tr>
<td>5. I can’t always perform HH in recommended situations because my patient’s needs come first</td>
<td>148 (93.0)</td>
<td>121 (96.0)</td>
<td>0.283</td>
</tr>
<tr>
<td>6. Prevention of HAI is a valuable part of a healthcare worker’s role</td>
<td>128 (80.5)</td>
<td>108 (85.8)</td>
<td>0.247</td>
</tr>
<tr>
<td>7. I follow the example of senior healthcare workers when deciding whether to perform HH</td>
<td>130 (81.6)</td>
<td>112 (88.9)</td>
<td>0.095</td>
</tr>
<tr>
<td>8. I believe I have the power to change poor practices in the workplace</td>
<td>49 (30.9)</td>
<td>63 (50.0)</td>
<td>0.001*</td>
</tr>
<tr>
<td>9. Failure to perform HH in the recommended situations can be considered negligence</td>
<td>17 (10.8)</td>
<td>65 (51.6)</td>
<td>0.000*</td>
</tr>
<tr>
<td>10. HH is a habit for me in my personal life</td>
<td>15 (9.3)</td>
<td>79 (62.5)</td>
<td>0.000*</td>
</tr>
<tr>
<td>11. I am confident I can effectively apply my knowledge of HH to my clinical practice</td>
<td>82 (51.7)</td>
<td>85 (67.6)</td>
<td>0.007*</td>
</tr>
<tr>
<td>12. It is an effort to remember to perform HH in the recommended situations</td>
<td>142 (89.1)</td>
<td>49 (38.9)</td>
<td>0.000*</td>
</tr>
<tr>
<td>13. I would feel uncomfortable reminding a health professional to hand wash</td>
<td>122 (76.6)</td>
<td>78 (62.3)</td>
<td>0.007*</td>
</tr>
<tr>
<td>14. If I disagree with a guideline I look for research findings to guide my practice</td>
<td>3 (2.1)</td>
<td>7 (5.4)</td>
<td>0.094</td>
</tr>
<tr>
<td>15. Performing HH slows down building immunity to disease</td>
<td>73 (46.1)</td>
<td>19 (15.1)</td>
<td>0.000*</td>
</tr>
<tr>
<td>16. Dirty sinks can be a reason for not washing hands</td>
<td>130 (81.8)</td>
<td>123 (97.6)</td>
<td>0.000*</td>
</tr>
<tr>
<td>17. Lack of an acceptable soap product can be a reason for not cleansing hands</td>
<td>152 (95.3)</td>
<td>123 (97.6)</td>
<td>0.357</td>
</tr>
<tr>
<td>18. Performing HH after caring for a wound can protect from infections</td>
<td>145 (91.4)</td>
<td>121 (96.2)</td>
<td>0.104</td>
</tr>
<tr>
<td>19. Cleansing hands after going to the toilet can reduce transmission of infectious disease</td>
<td>156 (98.0)</td>
<td>124 (98.2)</td>
<td>0.848</td>
</tr>
</tbody>
</table>

HH - Hand Hygiene; HAI - Healthcare-associated Infections; *significant at p ≤ 0.05
Table 4. Gender Distribution of Hand Hygiene Importance (n=285)

<table>
<thead>
<tr>
<th>Questionnaire Items</th>
<th>Males n (%)</th>
<th>Females n (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hand hygiene is considered an important part of the curriculum</td>
<td>83 (52.0)</td>
<td>69 (55.0)</td>
<td>0.667</td>
</tr>
<tr>
<td>2. The facilities in which I do clinical practicum emphasize the importance of</td>
<td>64 (40.0)</td>
<td>78 (62.0)</td>
<td>0.000*</td>
</tr>
<tr>
<td>hand hygiene</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. The importance of hand hygiene is emphasized by my clinical supervisors</td>
<td>72 (45.1)</td>
<td>61 (48.2)</td>
<td>0.599</td>
</tr>
</tbody>
</table>

*significant at p ≤0.05

participants’ hand washing knowledge and the gender differences highlight the need for gender-specific educational programs.

This study revealed that HH would be accomplished if there is personal threat of infection as it was one of the factors where higher numbers of females reported better practice than males. These findings are similar to that mentioned by Cruz [14] in Saudi Arabia. Anderson [18] also reported a significant association between gender and hand washing behavior, with more female students washing their hands compared with their male peers. Whitby et al [10] and Pittett [11] have also suggested that HCWs’ HH behavior “is largely motivated by self-protection rather than the protection of others”. Undergraduate curricula need to emphasize ethical behavior to encourage students to consider the right of patients to safe care. Although faulty practice can be corrected by certified healthcare providers, the belief is not simple to rectify [12]. The correct beliefs toward infection control and HH among students is expected to play a major role in reduction of disease transmission when the medical students join the healthcare work force in the future. Many studies reported that HH compliance reflects the attitudes, behaviors, and beliefs of healthcare personnel [12,20].

The present study revealed that the majority of medical students agreed with nearly most of the positive statements about HH. The results were slightly different from a study that reported moderate agreement of students with positive statements about HH, where students were unsure about whether they follow the example of senior HCWs in relation to HH, whether dirty sinks or lack of an acceptable soap product were reasons for non-compliance [9]. However it was similar to our work in revealing strong agreement that HH reduces patient mortality, costs, and infection transmission, and is a valuable part of a HCW’s role. Another study reported that medical students also believed that the HH compliance would be even worse at the level of experienced physicians and senior consultants though the seniors are often considered to be role models for trainees [21].

Furthermore, this study showed that female students expressed strong agreement with all positive HH statements compared to males. Females were significantly more confident and agreed that they are a positive role model in HH for other HCWs, HH can reduce patient mortality and medical costs, HH is a life habit, they can apply HH knowledge in clinical practice, dirty sinks is a barrier for washing hands and failure to perform HH can be considered negligence. These results were concomitant with the study conducted in Saudi Arabia on female nursing students who expressed better attitude toward HH compared to males. Also the current results were in agreement with another study that showed female staff significantly scored higher than male members in attitude regarding clinical practice guidelines including HH [22]. In addition, an Italian study on ICU personnel revealed significantly higher positive attitude among females on hand decontamination [23]. Johnson et al [24] explained females’ higher compliance with their affinity to practice socially acceptable behaviors.

The current study showed that approximately half of the student reported correct statements about the importance of HH. Al Kadi et al [17] concluded that students are
stuck to build defective HH practice if the curriculum was not supported with correct HH concepts and skills. One such series is reported by Anwar et al. [25] from a leading medical training center in Pakistan. It is for this that the Hygiene Liaison Group, UK [26] strongly advocates teaching elementary hygiene practices at medical schools. Our study has a few limitations. The study focused only in identifying the gender differences on knowledge, attitude, and practice of HH. It didn’t consider the possible contributing factors to the existence of such differences. Self-reported answers made the results somewhat subjective. Furthermore, this study was conducted only in a single medical college, so the results obtained cannot be generalized for all Egyptian medical students.

CONCLUSIONS

This study determined the gender differences, which can be observed in the knowledge, belief, and practice of HH. Female medical students had better knowledge and better self-reported practice than the male students. Emphasizing the importance of HH in education and assessment, particularly in the clinical settings, may improve students’ HH knowledge, beliefs and practices as well as facilitate a more encouraging culture towards HH. Thus, the risk of transmitting infection in healthcare facility will be reduced. The gender differences in this study call for educational interventions to improve HH. The interventions have to be targeted and gender-specific to meet the demands of the students. A nationwide study of a bigger sample covering all medical faculties in Egypt should be undertaken to confirm these results.

AUTHORS’ CONTRIBUTIONS

Both authors contributed in developing the research idea, data collection, analysis and interpretation. Both authors have read and approved the final manuscript.

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CONFLICT OF INTEREST

Authors have declared that no competing interests exist.

REFERENCES


