Current hand hygiene education is suboptimal

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SUMMARY

Background: To address the low levels of hand hygiene compliance (HHC) at our academic medical centre, we developed an annual patient safety course required for all incoming third-year medical students. Based on previous observations of medical students, it was determined that hand hygiene (HH) would be a central component of the course.

Methods: Over a 1-year period (2015/16), we observed third- and fourth-year medical students who had participated in the annual patient safety course entering three intensive care units (ICUs) at two teaching hospitals. A total of 150 medical students failed to perform HH on entry and were subsequently asked why they did not comply.

Results: Of the 150 medical students observed entering an ICU without performing HH, 74.7% were male and 25.3% were female. Males cited inadequate time (21.4%), lack of role models (10.7%) and provided incorrect information regarding HH requirements (58.9%). Females cited concerns about dry or cracked skin (34.2%) and forgetting (23.7%).

Discussion: Our study demonstrates that even when medical students receive intensive HH education, compliance remains low. Of note, males and females offered different reasons for why they failed to perform HH. To address the suboptimal HHC, we developed an annual patient safety course required for all third-year medical students immediately prior to beginning clinical rotations. In this study, we sought to understand why medical students’ HH remains suboptimal even after an intensive course.
INTRODUCTION

Hand hygiene (HH) is recognised as the most important modifiable behaviour to prevent health care-associated infection (HAI). The World Health Organization (WHO) reports an average compliance rate of less than 40.0% among health care practitioners, however, ranging from medical students to specialists. Although it has been established that health care workers’ hands are the most common vehicle for the transmission of pathogens, nearly 75,000 patients died from HAI during hospitalisation. A critical first step to building ingrained hand hygiene compliance (HHC) is to reinforce HH training throughout medical education.

Although there is limited research related to medical students’ and residents’ HH practices, the training years represent a critical opportunity to develop good HH behaviours. Even when educational interventions are introduced and students learn the WHO Five Moments, compliance remains low. Previous reports show that when challenged about a lack of HH, medical students cite a lack of knowledge and insufficient education, an underestimation of the risks, poor role models, and workplace culture.

Medical students self-report higher HHC than is actually observed, and have expressed dissatisfaction with HH training. This may be an unwanted consequence of how undergraduate curricula are structured; however, medical students report that they need further in-depth training on hygiene-related guidelines. Role models are essential to improving HHC, as trainees showed improved HHC when attending physicians demonstrated proper techniques. One study demonstrates that nursing students show significantly better knowledge and attitudes towards HHC than medical students, suggesting that this might be an opportunity for interdisciplinary education. To date, no study has examined recent HHC among US medical students in an environment with a mandatory, comprehensive HH educational programme to identify issues that might play a role in poor HH. It has been suggested that exploring the theories that underpin the environment and behaviour motivation would lead to a better understanding of HHC.

To address the low rates of HHC at our academic medical centre, we developed an annual patient safety course required for all incoming third-year medical students (Box 1). Based on observations of medical students, it was determined that HH would be a central component of the course. The course takes place in the week immediately prior to students beginning third-year clinical rotations, when they are undistracted by other academic commitments. Despite these initiatives, we continue to observe suboptimal HHC in clinical settings. For this study, we sought to identify the reasons for this failure to perform HH despite what appeared to be extensive educational programmes.

METHODS

For a 1-year period following the completion of the 2015 patient safety course, two trained observers (one physician and one nurse) visually verified the HHC of third- and fourth-year medical students (approximately 150 students per class) upon entry to the intensive care unit (ICU). One observer was stationed outside the entrance and one was stationed inside the unit at three different ICU locations at the same academic medical centre (each with a central observable entrance and with individual patient rooms).

During the 3-day observation period, every medical student who entered the ICU and failed to perform HH using an alcohol-based hand rub (ABHR) before entering the patient room was asked to explain why they did not clean their hands. This study did not include students who performed HH upon entry to the ICU. All students who failed to perform HH were also asked whether they saw the HH reminder sign outside the ICU and if they knew that HH was required prior to entry. If they acknowledged seeing the sign, they were asked to describe it. The same observers questioned the medical students throughout the study period. The results were de-identified, except for gender, and received an exemption from the Ethics Review Committee (University of Miami Institutional Review Board).

Statistical analysis

To compare reasons for not performing HH upon entry to a private ICU room between males and females, we used a chi-square analysis with the Pearson chi-square test if all cells had an expected value of five or greater, and an exact chi-square test if all cells had an expected value of less than five. We used the same type of analysis to compare males and females on their awareness of an HH reminder sign and their ability to describe the sign if they saw it. The 0.05 alpha level was used to determine the statistical significance of the chi-square tests. SAS 9.4 (SAS Institute, Inc., Cary, NC, USA) was used for all analyses.

RESULTS

Of the 150 medical students observed entering a private ICU room without performing HH, 112 (74.7%) were male and 38 (25.3%) were female (p < 0.001). Males cited inadequate time (n = 24, 21.4%), a lack of role models (n = 12, 10.7%) and provided incorrect information regarding HH
requirements, such as the belief that HH is only necessary if a physical examination was to be performed \((n = 66, 58.9\%)\). Females cited concerns about dry or cracked skin \((n = 13, 34.2\%)\) and admitted to simply forgetting more often \((n = 9, 23.7\%)\) (Table 1).

When asked whether they saw the HH reminder sign, the majority of the students stated that they had not seen the sign. There was no difference between gender of who stated that they observed the reminder sign \((p = 0.126)\). Among the 65 students \((43.3\%)\) who said that they saw the sign, many could not describe it. This number was significantly different between the genders: only 29.2\% \((n = 13, 34.2\%)\) and admitted to simply forgetting more often \((n = 9, 23.7\%)\) (Table 1).

Table 1. Explanations from medical students who did not perform hand hygiene

<table>
<thead>
<tr>
<th>Medical students ((n = 150))</th>
<th>Males (n = 112)</th>
<th>Females (n = 38)</th>
<th>(p) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forgot</td>
<td>8 (7.1%)</td>
<td>9 (23.7%)</td>
<td>0.014</td>
</tr>
<tr>
<td>Concerns about dry or cracked skin</td>
<td>2 (1.8%)</td>
<td>13 (34.2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Inadequate time or feeling rushed</td>
<td>24 (21.4%)</td>
<td>2 (5.3%)</td>
<td>&lt;0.025</td>
</tr>
<tr>
<td>Incorrect understanding of hand hygiene requirements</td>
<td>66 (58.9%)</td>
<td>13 (34.2%)</td>
<td>0.014</td>
</tr>
<tr>
<td>Blamed lack of hand hygiene on role models</td>
<td>12 (10.7%)</td>
<td>1 (2.6%)</td>
<td>0.186</td>
</tr>
</tbody>
</table>

As our medical school class is equally divided by gender, we would have expected an equal distribution of gender for those not performing HH; however, 56 \((74.7\%)\) of those who failed to perform HH in our study were male, reaffirming the previously noted observation that males have lower HHC rates than females.\(^{14}\) This study clearly demonstrates that rates of HHC and the reasons cited for non-compliance differ by gender. Females cited concerns about skin issues, and the data suggest that they are more likely to admit that they forgot. Males cited a lack of time and poor role models when questioned. Based on these results, optimised HH educational programmes may need to take gender into consideration.

Therefore, we have made changes to our course. In particular, we have addressed the fallacy that ABHR is harsher than soap and water. Also, we have conducted continuing education with our registrars (residents) and consultants (attending physicians), so that they have awareness of their impact as role models on HH behaviour. There is clearly a need for a systematic approach to educational design, especially in the context of behaviour change.

Furthermore, the percentage of medical students who saw the signs did not differ by gender but was so low as to suggest that our signs are not optimally designed. As signs alone have been shown to be ineffective even when well designed,\(^{11}\) their impact on medical students requires further investigation. Consequently, we have revised our HH signs for greater impact.

This study has several limitations. First, it is possible that some medical students were asked about non-compliance more than once. Numerous medical students rotate through the ICU, and all were included if their identification badge said ‘Medical Student’. It is unlikely that this happened more than a few times, especially as only one person performed the interviews. Second, no data were collected regarding the overall rate of HHC among our students, nor did we evaluate students who performed HH upon entry to the ICU. This study was not designed to evaluate the percentage of compliance, but rather to gain an understanding of why students fail to perform HH. Also, this study did not compare the HH of third- versus fourth-year medical students, but this may be somewhat unimportant as the overall rate of HHC was below expectations. Furthermore, the students were not observed leaving the ICU, but the rate of HHC when leaving is likely to be lower than the rate when entering the ICU. Last, it was difficult to determine whether the answers given could be attributed to gender-related distinctions in communication, particularly in relation to stating that they saw the sign but not being able to describe it.

Although education has been suggested as being key towards improving HHC, this study would suggest that other steps are essential. Further investigation is necessary, especially in relation to better educational programmes.
A critical first step to building ingrained hand hygiene compliance is to reinforce HH training throughout medical education

Box 1. Content and structure of the patient safety course

- Prior to beginning clinical rotations, third-year medical students are required to participate in a 5-day patient safety course
- The course strongly emphasises the importance of hand hygiene compliance to prevent pathogen spread
- Every lecture, exercise, simulation, video and debriefing during the course directly involves at least two activities focused on hand hygiene compliance
- Each time a medical student has a standardised patient encounter during the week, they are specifically observed for hand hygiene compliance
- Depending on their behaviour, there are debriefing sessions to re-affirm the importance of hand hygiene compliance
- The patient safety course began in 2010 and was modified to increase hand hygiene instruction in 2014

as well as the gender differences found in this study.

Trainees and educators want improved HH education beginning at the student level and continuing into the clinical arena; however, the most effective HH training programmes have yet to be determined. Until medical students understand that HH is the most effective method to prevent HAI, current approaches will remain inadequate. Moreover, students must see that their faculty members take this seriously in everyday practice. Hand hygiene and health care-associated infection cannot remain a ‘back burner’ issue – the safety of tomorrow’s patients is in the hands of future practitioners and today’s medical educators.

References


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