A multifaceted approach to improve hand hygiene practices in the adult intensive care unit of a tertiary-care center

Hasan M. Al-Dorzi, Amal Matroud, Khaled A. Al Attas, Ahmad I. Azzam, Adel Musned, Brintha Naidu, Tamara Govender, Zandile Yeni, Chinette Abarintos, David White, Hanan Balkhy, Yaseen M. Arabi

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**KEYWORDS**
- Hand hygiene;
- Critical care;
- Quality improvement;
- Intensive care unit

**Summary:** A multidisciplinary team was formed to improve hand hygiene (HH) practices in a tertiary-care ICU. At baseline, an audit revealed that the overall HH compliance was 64% and was significantly lower at night than during the day shift. After implementing a stepwise multifaceted approach that included education, workplace reminders, active feedback and later universal contact precautions, the HH compliance improved significantly to >80%, and the improvement was sustained over several months. This improvement was noted during the day and night and affected different healthcare workers as well as visitors.

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**Rationale**

Adequate hand hygiene (HH) is crucial to preventing healthcare-associated infections. Improving HH practices in intensive care units (ICUs) is a major patient safety initiative because HH compliance in these units is often low (30–40%) [1] and critically ill patients are at high risk of healthcare-associated infections. The World Health Organization (WHO) recommends the implementation of a multidisciplinary, multifaceted and multimodal program to improve adherence of healthcare workers (HCWs) [2]. This study evaluated a quality improvement project to improve HH practices in a tertiary-care ICU.

**Methods**

This study was a quality improvement project conducted at the Intensive Care Department of King Abdulaziz Medical City-Riyadh, Saudi Arabia. The hospital was a 900-bed tertiary-care hospital that had an active infection prevention program and was a pilot site for the WHO ‘‘Clean Care is Safer Care’’ initiative in 2008. The ICU was a 21-bed medical-surgical closed unit, was continuously covered by onsite board-certified intensivists and registrars, had a nurse-to-patient ratio of 1:1 and used an open visiting policy. As part of this project, we evaluated the ICU’s HH infrastructure using the System Change section of the WHO Hand Hygiene Self-Assessment Framework questionnaire; its score was determined to be 100%. To evaluate HH practices and improve them, a multidisciplinary HH team was formed by the department chairman in February 2011 and included ICU physicians, nurses, respiratory therapists and an infection control specialist. Trained ICU staff audited HH practices of HCWs and visitors using the WHO audit tool, modified to additionally note the appropriateness of the HH technique (performance of all WHO recommended steps) and procedure time (categorized into day shift from 0700 to 1859 and night shift from 1900 to 0659). The compliance rate was calculated by adherence to the WHO five moments of HH [2] by hand washing or alcohol-based hand rub. The team met on a regular basis (initially weekly then monthly), reviewed audit results and implemented the following interventions in a stepwise and escalating manner: HH education for staff, new hires, rotating residents and visitors using videos, coaching and online modules; workplace reminders including HH breaks at 1100 and 2200, during which all ICU staff demonstrated proper alcohol-based hand rub; addressing perceived HH barriers; active feedback of HH compliance to all staff by direct communication and emails; empowerment of staff to educate and stop violators; and warning letters from the chairman for repetitive violations. In addition, universal contact precautions were instituted for all patients from February 2012 onwards due to the outbreak of multidrug-resistant organisms in the ICU. The Chi-square test was used to assess differences among groups. HH compliance rates were reported as run charts.
Results

Based on 836 observations, the baseline HH compliance rate (February–March, 2011) for all HCWs was 64% (68% for physicians and 62% for both nurses and respiratory therapists). The compliance rate was significantly lower before patient contact (53%) than after contact (78%, p < 0.001) and lower during night shifts (53%) than during day shifts (78%, p < 0.001). The HH technique was frequently inappropriate (72% for physicians and 57% for nurses and respiratory therapists, p = 0.01). ICU visitors had a low HH rate (24%). A subsequent audit consisted of 5626 observations from July 2011 to October 2012. Fig. 1 shows the run charts of monthly HH compliance and reveals that the compliance gradually increased starting November 2011, with a steep improvement in March 2012, after which HH compliance was sustained at above 80%. This compliance coincided with the universal application of contact precautions. Fig. 2 shows that the improvement occurred in the day and night shifts and affected HH technique as well.
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Figure 2  Monthly rates of HH compliance in the day and night shifts and of inappropriate HH technique. The baseline period was February and March 2011. *Day shift: 0700–1859; night shift: 1900–0659; **when hand hygiene was performed.

Discussion

We reported on our project to improve HH practices in a tertiary-care ICU and found that a stepwise multifaceted approach that included universal contact precautions led to a significant and sustained improvement in HH.

At baseline, we found that HH rates were significantly lower in the night than the day, when the workload is usually higher. This result was opposite to the finding of a multicenter study in which mornings and afternoons were associated with decreased HH compliance compared to nights based on multivariate analysis [3]. This discrepancy can be explained by HH monitoring being conducted only during the regular working hours before our project and by the low staff number during the night shifts. We also noted that the HH technique was frequently inappropriate, which could be related to inadequate knowledge or due to a theory–practice gap [4].

Our improvements in HH practices resulted from a system redesign that required crucial factors for success, such as leadership involvement and support, development of a multidisciplinary team and establishment of performance appraisal systems [5]. The multidisciplinary HH team implemented multifaceted interventions and continuously monitored the process. Applying universal contact precautions, an aspect of system redesign, was closely related to HH improvements and may have represented a form of forcing functions to improve guideline adherence. However, another study found that gown-use requirement was associated with a small improvement only in after-care HH compliance (48% versus 41%, p = 0.02) based on adjusted analysis [6].

In conclusion, the development of a multidisciplinary team with a multifaceted approach was associated with sustained improvement in HH practices in a tertiary-care ICU.

Conflict of interest

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Ethical approval: Not required.

References

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