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SHORT REPORT

# Assessment of hand hygiene techniques using the World Health Organization's six steps



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## KEYWORDS

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**Summary** The quality of hand hygiene was evaluated via direct observation for compliance with the six recommended World Health Organization steps. A total of 2497 HH opportunities, of which 1573 (63.0%) were hand rubs, were monitored over a five month period. Compliance was higher in nurses compared with physicians and auxiliaries and in steps 1 and 2 for hand rubs as well as the first three steps of hand washing, with lower rates after these steps. Rubbing of the thumbs and fingertips achieved the lowest rates of compliance in both HH types. A combination of the five recommended moments and six steps and staff education is recommended to improve the quality of hand hygiene.

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## Introduction

Monitoring the five moments of hand hygiene by direct observation is an during standard practice recommended by the World Health Organization (WHO) and constitutes a critical measure for the prevention of healthcare-associated infections [1]. According to multiple reports, compliance with hand hygiene remains low among healthcare workers, ranging from 5% to 89% [2]. The WHO's

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recommended hand hygiene includes six unique steps with the primary objective of ensuring adequate coverage of all hand skin surfaces [1] by cleaning products.

In a community hospital with 75 beds in Qatar, we implemented HH monitoring according to WHO recommendations by trained observers (mainly nurses) and observed between 60 and 90% compliance across different departments. However, in observations made during routine infection control rounds, the quality of HH performed by medical and non-medical staff constituted a concern. The purpose of this study was to evaluate compliance with the 6 steps approach for hand hygiene by medical personnel.

## Methods

The monitoring of hand hygiene techniques was conducted over a 5-month period (August–December, 2014) by staff nurses trained in data collection according to the six steps of the WHO (palm to palm, right palm over left dorsum and vice versa, palm to palm with fingers interlaced, backs of fingers to opposing palms, rubbing of thumbs and fingertips). The observers did not participate in the routine monitoring system implemented in the facility, and the staff was not informed about the study. The infection control department provided training and prepared a collection form for the six steps to be monitored, including information about the HH type (hand rub (HR) or hand washing (HW)) and the staff category (nurses, physicians and auxiliaries). The observations were performed during different shifts, seven days of the week, without interfering with patient care. Information about the HH procedures was gathered from seven inpatient and four outpatient departments, with a maximum time of continuous observation of 30 min per shift. As a general rule, a minimum of 50 opportunities had to be observed in each staff category in each department during the study period. During the study period, no feedback was provided to staff or leaders. The proportions of compliance with each step (per 100 observations) according to the staff category were calculated. Comparisons of compliance among categories were analyzed using the  $\chi^2$  test. All *p* values less than .05 were considered to be statistically significant.

## Results

A total of 12,497 HH opportunities were monitored, of which 1573 (63.0%) were hand rubs. Of these,

42.2% of observations were performed by physicians, 38.4% by nurses and 19.4% by auxiliaries.

Hand rub compliance was 100% in steps 1 and 2 for all categories (Fig. 1). The nurses achieved the highest compliance rates for steps 3 (99.7%), 5 (30.1%) and 6 (51.1%) compared with physicians and auxiliaries ( $p < 0.05$ ). Meanwhile, physicians achieved the best rates of compliance with rubbing the back of the fingers (84.8%) ( $p < 0.05$ ). In general, only the three first steps had good compliance. After that, the rates dropped to 79.9% in step 4 and 14.9% (step 5) and 36.6% (step 6) in later steps. Similarly, for hand washing, high compliance was achieved in all categories for the first three steps, with a drop to 70.6%, 30.3% and 40.9% in steps 4, 5 and 6, respectively, with better compliance in nurses ( $p < 0.05$ ).

## Discussion

Compliance rates of 90% across five months of observed HH, according to our goal, may not be enough to prevent healthcare-associated infections. This fact is especially relevant if all skin surfaces are not covered or if the contact time of the HH products is too short to ensure proper antimicrobial activity.

Tschudin and Sutter A et al. [3] have shown a low overall compliance with the WHO techniques, with better compliance for steps 1 and 2 and no differences between categories (professions). Step 4 (back of fingers to the opposite palms with fingers interlaced) and step 6 (rotational rubbing of fingers) showed the lowest rates of compliance. Our observations identified that step 5 (rotational rubbing of the left thumb clasped in the right palm and vice versa) had the lowest compliance and that there was better overall compliance in nurses. Park HY et al. [4] report better compliance in nurses (90.5%) but without differences in hand surface coverage between nurses (8.3%) and doctors (8.8%) and lower compliance rates for other healthcare professionals.

Other studies have described the evaluation of HH quality using a fluorescent substance and adenosine triphosphate technology [5–7]. Pan SC [5] identifies the tips of the nail and the fingertips as the most common residue points after application of a fluorescent substance, and Szilagi L et al. [6] identified a failure to clean the dorsal and palmar areas in 24 and 18% of the instances.

Our results have shown the inability to comply with recommendations regarding hand hygiene techniques by healthcare professionals regardless of their category, which constitutes a risk

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