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RESEARCH ARTICLE

# Direct observation of hand hygiene can show differences in staff compliance: Do we need to evaluate the accuracy for patient safety?

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## ABSTRACT

**Background:** Direct observation of hand hygiene is the standard practice recommended by the World Health Organization to monitor its compliance.

**Objective:** To evaluate the accuracy of hand hygiene observation performed by units' observers.

**Methods:** A descriptive study was carried out in seven patient care units in a 75-bed community hospital in Qatar. Four trained nurses performed hand hygiene observation in May 2016, any day of the week and in different shifts, following the same methodology as routine units' observers. Hand hygiene opportunities were registered, including hand hygiene moments, staff category, and actions (handrubs, hand washing, missed hand hygiene, and gloves without hand hygiene).

**Results:** During January – May 2016, routine monitoring reported 25,319 opportunities with a compliance of 89.2%, and 91.6% for nurses, 89.6% for physicians, and 85.1% for ancillary staff. Trained external observers reported 815 opportunities and compliance of 54.7%, with the highest compliance observed after blood and body fluid exposure (80.0%) and after patient contact (85.5%), and the lowest figures before patient contact (34.2%) and before aseptic procedure (34.0%).

**Conclusion:** This study provides essential information about the accuracy of the monitoring procedure and the compliance of hand hygiene that requires immediate action to protect patients and staff from healthcare-associated infections.

**Keywords:** hand hygiene, monitoring, accuracy, five moments, compliance, staff category, Qatar

## INTRODUCTION

Hand hygiene (HH) constitutes the principal prevention practice for healthcare-associated infections, and the monitoring of compliance is a fundamental quality indicator in healthcare facilities.<sup>1,2</sup> Evidence shows that HH compliance ranges from 5% to 89%, with an average of 38.7%.<sup>1</sup> Similar figures have been reported in recently published papers from Brazil, Australia, and India.<sup>3–5</sup>

The monitoring of HH can be performed using different methods, including direct observations of practices, measuring the product use, conducting a survey, and more recently through video monitoring and electronic surveillance.<sup>6</sup> Direct observation is the standard practice recommended by the World Health Organization, which is limited by the Hawthorne effects and interobserver variation.<sup>7,8</sup> Despite its limitation, direct observation of practices is the most feasible methodology to monitor HH for healthcare systems with increased financial pressures. An important advantage of this method is the possibility of evaluating the six-step technique recommended by the WHO in addition to monitoring the five moments.<sup>9</sup>

Direct observation of HH for its monitoring is implemented in all public healthcare facilities in Qatar, using trained observers in patient care units.<sup>10</sup> The compliance rates reported by these facilities are between 60 to 90% (unpublished data). Recently, we observed an increased compliance of up to 90% in a 75-bed community hospital. However, additional observations provides us evidence of lower compliance, and therefore this study was conducted to evaluate the accuracy of HH observation performed by units' observers.

## METHODS

This study was conducted in seven different patient care units, including inpatient wards, critical care unit, emergency department, and operation theaters, in a 75-bed community hospital in Qatar.

### Current system for monitoring HH

In healthcare units, direct observations performed were conducted seven days a week and in different shifts, using the WHO forms for data collection.<sup>11</sup> The observers (mainly nurses) were trained by the infection control (IC) department staff upon selection by the units' head. A summary report with information

about compliance by category, drafted by the unit's head, is sent to the IC department on a monthly basis to complete the hospital-level compliance.

### External observers

Four nurses, trained by the IC staff, performed the observation during the observation period (May 2016) in different shifts, any day of the week, in the previously mentioned units, following the same methodology as routine units' observers. During the monitoring session (maximum of 20 minutes), the observers registered the HH opportunities in the collection form, including moments (before patient contact, before performing an aseptic task, after exposure with body fluids, after patient contact, and after contact with patient's surroundings), staff category (nurse, physician, ancillary), and actions (handrubs, hand washing, missed HH, and gloves without HH). The units' heads were not informed of the external observations, and no feedback was provided to staff or leaders until the completion of the study.

The study procedure was considered a component of the IC program and did not interfere with patient care. For this reason, no ethical approval was required before the study.

The number of HH tests performed (handrubs or hand washing) divided by the number of opportunities and expressed as a percent of opportunities was calculated for each HH moment and category. The routine compliance data collected from January to May 2016 and the data collected by external observers were compared.

The HH compliance in the different units were compared using the homogeneity test (with Yates correction). The analyses were conducted using SPSS version 22.0 software (SPSS Inc., Chicago, IL, USA). All tests of statistical significance were two-sided, with the level of significance set at 0.05.

## RESULTS

### Routine HH monitoring data

During January – May 2016, 25,319 HH opportunities were documented with a compliance of 89.2%. The fourth unit achieved the lowest compliance (76.3%), and the second unit achieved the highest compliance (93.3%) (Figure 1). The compliances according to category were 91.6% for nurses, 89.6% for physicians, and 85.1% for ancillary staff (Figure 2).

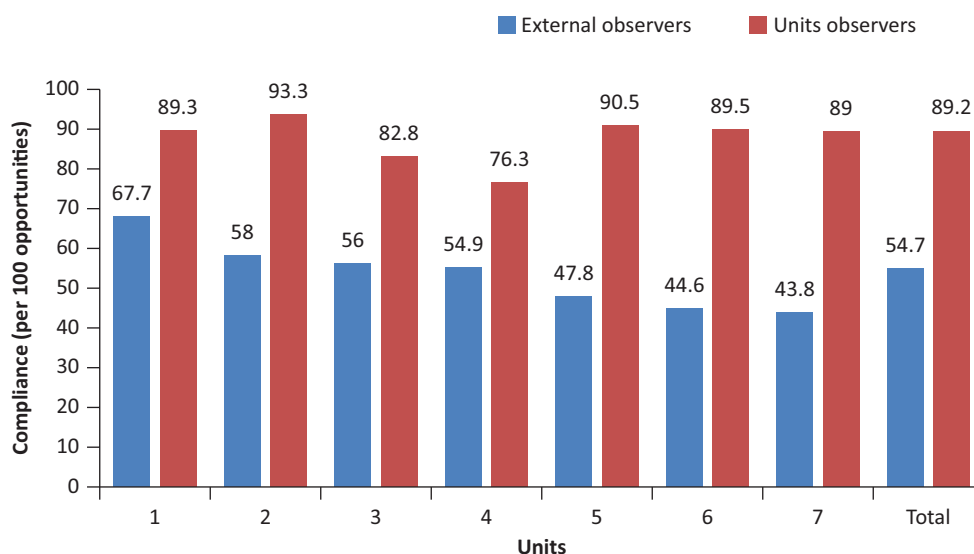


Figure 1. Compliance of hand hygiene according to external observers and unit observers (Jan – May 2016) (per 100 opportunities).

### External observation of HH monitoring data

A total of 815 HH opportunities were observed in the selected units (Table 1). The total compliance was 54.7%, with the lowest figure in the seventh unit and the highest in the first unit. Handrubs were performed in 41.2% of the opportunities and hand washing in 13.5%, while missed HH was observed in 37.4% opportunities and the use of gloves without previous HH was observed in 7.9% opportunities. The highest compliances was observed after blood and body fluid exposure (80.0%) and after patient contact (85.5%), and the lowest figures were observed before

patient contact (34.2%) and before aseptic procedure (34.0%).

### Data comparison

Figures 1 and 2 depict the compliance by units and category for the routine data and external observers. A significant difference in compliance is evident with the lowest figures for the data collected by external observers ( $p < 0.001$ ). In units 7, 6, and 5, the differences among observers were 45.2%, 44.9%, and 42.7%, respectively, with small gaps for units 1 and 4. According to category, the differences were

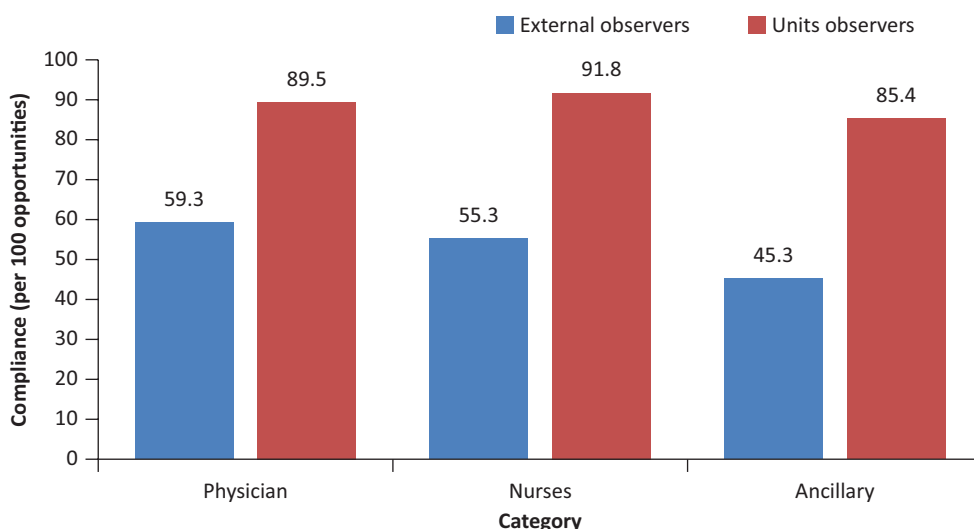


Figure 2. Compliance of hand hygiene according to category as per external observers and unit observers (Jan – May 2016) (per 100 opportunities).

Table 1. Compliance with hand hygiene according to units and hand hygiene moments (per 100 opportunities) as per external observers.

Variable	No. of opportunities	Hand rubs		Hand washing		Compliance		Missed		Gloves		Non compliance	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Units													
1	65	11	16.9	33	50.8	44	67.7	9	13.8	12	18.5	21	32.3
2	69	31	44.9	9	13.0	40	58.0	26	37.7	3	4.3	29	42.0
3	402	194	48.3	31	7.7	225	56.0	156	38.8	21	5.2	177	44.0
4	113	40	35.4	22	19.5	62	54.9	44	38.9	7	6.2	51	45.1
5	46	21	45.7	1	2.2	22	47.8	21	45.7	3	6.5	24	52.2
6	56	22	39.3	3	5.4	25	44.6	26	46.4	5	8.9	31	55.4
7	64	17	26.6	11	17.2	28	43.8	23	35.9	13	20.3	36	56.2
Hand hygiene moment													
Before patient contact	319	86	27.0	23	7.2	109	34.2	169	53.0	41	12.9	210	65.8
Before aseptic procedure	97	11	11.3	22	22.7	33	34.0	58	59.8	6	6.2	64	66.0
After blood and body fluid	15	2	13.3	10	66.7	12	80.0	0	0.0	3	20.0	3	20.0
After patient contact	283	199	70.3	43	15.2	242	85.5	34	12.0	7	2.5	41	14.5
After patient surrounding	101	38	37.6	12	11.9	50	49.5	44	43.6	7	6.9	51	50.5
Total	815	336	41.2	110	13.5	446	54.7	305	37.4	64	7.9	369	45.3

40.1% for ancillary, 36.5% for nurses, and 30.2% for physicians.

## DISCUSSION

Our study demonstrates a significant failure of the current monitoring system to evaluate the quality of HH, when compared with external observation. Furthermore, lower compliance was observed with HH at moments 1 and 2, which are more related to patient safety.

The observer bias has been previously described as a disadvantage of this method, which could be due to multiple factors.<sup>6,8,12</sup> Dhar reported similar results, with compliances of 58.6% and 79% in unit-based observers and non-unit-based observers, respectively.<sup>8</sup> The training and skill of the observer are essential factors to be considered, and therefore the observer should receive an initial training and periodic reinforcement of education, focusing on technical issues to conduct observations, with emphasis on the different scenarios.<sup>1</sup> The frequent presence of physical barriers that interfere with the continuity of the observations, especially upon entering or exiting patient rooms should be addressed. A recently published study conducted in three acute care hospitals demonstrated the feasibility of the entry/exit method for direct observation of HH compliance monitoring.<sup>13</sup>

In addition, the Hawthorne effect has been extensively described and constitutes a well-known limitation of direct observations.<sup>13</sup> We recommend secret observers in our setting to minimize the effect of the presence of an observer in staff compliance.

The compliance with HH documented by external observers constituted an area of concern, regardless of similar results reported globally.<sup>1,3-5,14</sup> The lowest compliance in the initial two moments is a fundamental quality gap, because these play a

relevant role in patient safety, while the next three moments aim to protect the staff, even when they are prone to the global risk of infection transmission.

Our study has several limitations related to the number of opportunities observed and the restriction to a few units, which have specific issues and practices that influence the HH practices. The possibility of calculating the sensitivity/specificity of the monitoring system is limited by the study design. The observations performed by nurses for all professional categories could introduce an observation bias when evaluating the performance of other nurses, which could be minimized with more education on the role of observers in patient safety and introducing annual evaluation of observers.

## Conclusion

We consider that this study provides essential information about the accuracy of the monitoring procedure and the compliance of HH that requires immediate action to protect patients and staff from healthcare-associated infections. Future research should focus on demonstrating the effect of training on the quality of the observations, compliance with HH, and patient involvement in improving HH compliance.

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## CONFLICTS OF INTEREST

No conflict of interest to declare for all the authors.

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