

Hand hygiene promotion system assessment in a long-term care facility in Qatar: a cross-sectional evaluation using the WHO Self-Assessment Framework

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Abstract

Introduction: Healthcare-associated infections (HCAs) cause substantial morbidity. Hand hygiene is the most effective preventive measure, but compliance is suboptimal, especially in long-term care. We assessed the hand hygiene promotion system at a long-term care facility in Qatar using a validated WHO tool, focusing on system readiness rather than directly observed compliance.

Methods: A cross-sectional facility self-assessment was conducted (March–April 2016) at Enaya Specialised Care Centre, Hamad Medical Corporation, Doha. Ten nursing staff were randomly selected to complete the WHO Hand Hygiene Self-Assessment Framework (27 indicators, five domains: System Change, Training and Education, Evaluation and Feedback, Workplace Reminders, Institutional Safety Climate). Descriptive statistics were used; total scores (0–500) were categorised into four WHO levels (Inadequate, Basic, Intermediate, and Advanced).

Results: The facility scored 327.5/500 – Intermediate (Consolidation) level. Domain scores: Workplace Reminders 96/100, System Change 84/100, Training and Education 80/100, Safety Climate 40/100, Evaluation and Feedback 27.5/100. All participants reported irregular direct observation, no immediate feedback to healthcare workers, no regular hand hygiene team meetings, and no formal patient engagement programme. No participant knew the facility’s actual hand hygiene compliance rate.

Conclusion: The facility has strong infrastructure, mandatory training, and visual reminders, achieving an Intermediate system level. However, major gaps exist in monitoring, feedback, and safety climate – areas that measure actual behavioural reinforcement, not just infrastructure. Priority actions include routine direct observation, real-time feedback, hand hygiene champions, and formal WHO Day observance. These findings reflect system readiness, not observed compliance, and should be interpreted as a baseline for quality improvement.

Keywords: Hand hygiene, Guideline adherence, Long-term care, Patient safety, Qatar

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Introduction

Healthcare workers’ hands are the most common vehicle for transmitting pathogens in healthcare settings. Hand hygiene is the single most effective measure to prevent healthcare-associated infections (HCAs) and reduce antimicrobial resistance transmission. Yet, despite decades

of promotion, adherence to recommended practices remains persistently low worldwide (1, 2).

The technical steps of hand hygiene are simple, but the behavioural and organisational factors that determine adherence are complex (3). In 2002, the US Centres for Disease Control and Prevention (CDC) updated hand



From the South, for the South, with the World

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hygiene guidelines, followed in 2004 by a Joint Commission National Patient Safety Goal requiring healthcare organisations to comply (4). The World Health Organisation (WHO) launched the “Clean Care is Safer Care” initiative in 2006, producing evidence-based guidelines and the multimodal hand hygiene improvement strategy (5). Systematic reviews consistently report median compliance below 50% in many settings (6), with long-term care facilities often lagging behind acute hospitals (7).

In Qatar, Hamad Medical Corporation (HMC), the principal public healthcare provider, adopted the WHO “Save Lives: Clean Your Hands” campaign in 2013, securing senior management commitment (8). However, a one-year observational study at Hamad General Hospital (2007–2008) reported a bacteraemia rate of 19 per 1000 admissions, with 42.9% having no identified source, underscoring the potential role of lapses in basic infection control (9). For long-term care facilities, which serve highly dependent residents with multiple comorbidities, the stakes are equally high. Joint Commission International (JCI) accreditation standards (IPSG.5) explicitly require reduction of HCAI risk through hand hygiene monitoring (10).

Enaya Specialised Care Centre (within Rumailah Hospital, Doha) is the first long-term care facility in the Gulf Cooperation Council region to achieve JCI accreditation for long-term care standards (2009, 2012, 2016). Despite this achievement, no systematic assessment of hand hygiene systems using a validated tool had been performed before 2016.

The WHO Hand Hygiene Self-Assessment Framework (HHSAF) is a validated diagnostic instrument that evaluates five domains and assigns a facility to one of four levels (Inadequate, Basic, Intermediate, and Advanced) (11). It measures system readiness (availability of infrastructure, training, reminders, monitoring processes, and safety climate), not directly observed compliance. This distinction is critical: a facility may have excellent systems yet still have low actual hand hygiene behaviour.

The objectives of this study were fourfold: first, to evaluate the existing hand hygiene promotion system at Enaya Specialised Care Centre, including infrastructure, training, workplace reminders, monitoring processes, and safety climate, using the WHO Hand Hygiene Self-Assessment Framework (HHSAF). Second, to determine the facility’s graded level (from Inadequate to Advanced) based on the system indicators. Third, to identify specific gaps in monitoring, feedback, and safety climate that impede progression to the Advanced level. Fourth, to provide actionable recommendations for system improvement, while emphasising that system readiness is a necessary but not sufficient condition for achieving high hand hygiene compliance.

Because ongoing compliance monitoring is a JCI requirement and a moral imperative for patient safety, this baseline assessment (conducted in 2016) serves as a foundation for quality improvement. No department or staff

member is exempt from continuous quality standards (12). The findings remain relevant for similar facilities in the Global South, where structured self-assessment can drive progress even when direct observation resources are limited.

Methods

Study design and setting

A cross-sectional descriptive facility self-assessment was conducted at Enaya Specialised Care Centre, Rumailah Hospital, Hamad Medical Corporation, Doha, Qatar, from 1 March to 30 April 2016. The facility provides skilled nursing care, rehabilitation, and personal care to fully or partially dependent residents. At the time of the study, it held JCI accreditation for long-term care standards.

Participants and sampling

The target population was nursing staff working in direct patient care for at least six months. From a total of 62 eligible nurses, ten were randomly selected using a computer-generated random number sequence (Microsoft Excel RAND function). Inclusion criteria: employed at the facility for ≥ 6 months, working in direct patient care, and willing to participate. No demographic data (age, sex, years of experience) were collected to preserve anonymity and avoid any perception of identification, in line with the facility’s confidentiality policy. All ten invited nurses agreed to participate (response rate 100%).

Instrument

The WHO Hand Hygiene Self-Assessment Framework (version 2010) was used without modification. It contains 27 indicators across five components:

Component 1: System Change (6 indicators, max 100 points) – availability of ABHR, sinks, water, soap, towels, and dedicated budget.

Component 2: Training and Education (6 indicators, max 100) – mandatory training, resources, trainer availability, observer validation, training budget.

Component 3: Evaluation and Feedback (5 indicators, max 100) – audits, knowledge assessment, indirect monitoring, direct observation, feedback.

Component 4: Reminders in the Workplace (7 indicators, max 100) – posters, leaflets, screensavers, badges.

Component 5: Institutional Safety Climate (6 indicators, max 100) – hand hygiene team, leadership commitment, WHO Day plan, champions, patient engagement.

Total possible score: 500. Based on total score, facilities are classified as: Inadequate (0–125), Basic (126–250), Intermediate (251–375), or Advanced (376–500). The framework has established content validity and test-retest reliability (11, 13).

Data collection

After obtaining institutional approval, the principal investigator met individually with each participant in a private room. Written informed consent was obtained. Each participant completed the HHSAF independently; the investigator clarified questions without leading. Responses were anonymous. A pictorial survey of physical infrastructure and reminders was also conducted (results available as [supplementary material](#)).

Scoring and aggregation

For each indicator, the unit score (as defined by the WHO framework) was multiplied by the frequency of responses to calculate an aggregate score. For example, if an indicator offered three scoring options (e.g., 0, 5, 10 points) and 5 participants chose 10 points, 3 chose 5 points, and 2 chose 0 points, the aggregate score was $(5 \times 10) + (3 \times 5) + (2 \times 0) = 65$. The mean score for that indicator was then $65/10 = 6.5$. Component subtotals were calculated by summing the mean scores for each indicator within the component. The overall hand hygiene system score was the sum of the five component subtotals. Descriptive statistics (frequencies, percentages, mean component scores, and ranges where applicable) were calculated using Microsoft Excel 2016. No inferential statistics were applied because the HHSAF is designed for descriptive self-assessment, not hypothesis testing.

Ethical considerations

Ethical approval was granted by the Hamad Medical Corporation Institutional Review Board (approval # HMC IRB 2016 123). All participants gave written informed consent. Data were anonymised and stored on a password-protected hospital server. The study complied with the Declaration of Helsinki.

Results

Participant characteristics

All ten invited nurses participated (response rate 100%). All worked in direct patient care across four wards (medical, rehabilitation, palliative, and ventilator-dependent units). No further demographic data were collected to maintain anonymity.

Component 1: System Change

Mean score 84/100 (range 60–100). All participants reported alcohol-based hand rub at every point of care, continuous running water, soap and single-use towels at every sink, and a dedicated budget for hand hygiene products. The sink-to-bed ratio was ≥ 1 per 10 beds in most wards, but not facility-wide. See Table 1.

Table 1: Component 1 - System Change

Indicator	Max	Mean (range)	%
ABHR availability	50	38 (30–50)	76
Sink-to-bed ratio ($\geq 1/10$ beds)	10	6 (5–10)	60
Continuous clean running water	10	10	100
Soap at each sink	10	10	100
Single-use towels at each sink	10	10	100
Dedicated budget for products	10	10	100
Total	100	84	84

Component 2: Training and Education

Mean score 80/100 (range 20–100). All participants confirmed mandatory training at commencement and annually, a system to confirm completion, availability of all

four WHO educational resources, and an active professional trainer. However, 80% were unaware of any training or validation system for hand hygiene observers, and 80% were unaware of a dedicated training budget. See Table 2.

Table 2: Component 2 – Training and Education

Indicator	Max	Mean (range)	%
Mandatory training (commencement & annual)	20	20	100
System to confirm completion	20	20	100
WHO educational resources available	20	20	100
Active professional trainer	15	15	100
Observer training & validation system	15	3 (0–15)	20
Dedicated training budget	10	2 (0–10)	20
Total	100	80	80

Component 3: Evaluation and Feedback

Mean score 27.5/100 (range 0–100). This was the lowest-scoring domain. All participants reported regular ward-based audits of hand hygiene resources (score 10/10) and annual knowledge assessment (10/10). However, no participant reported regular indirect monitoring (ABHR/soap consumption). All stated that direct observation of hand

hygiene compliance occurred irregularly; none knew the facility’s overall compliance rate. Immediate feedback to healthcare workers was never given. Systematic feedback to leadership occurred (7.5/7.5) but not to frontline staff. See Table 3.

Table 3: Component 3 – Evaluation and Feedback

Indicator	Max	Mean (range)	%
Regular ward-based resource audits	10	10	100
Annual HCW knowledge assessment	10	10	100
Indirect monitoring (consumption)	15	0	0
Direct observation frequency	15	5 (irregular)	33
The overall compliance rate is known	30	0	0
Immediate feedback to HCWs	5	0	0
Systematic feedback to HCWs	7.5	0	0
Systematic feedback to leadership	7.5	7.5	100
Total	100	27.5	27.5

Component 4: Reminders in the Workplace

Mean score 96/100 (range 73–100). This was the highest-scoring domain. All participants reported posters for hand hygiene indications, correct ABHR use, and correct

handwashing technique in all wards; additional posters, leaflets, and other reminders (screensavers, badges, stickers) were present. Poster audit frequency varied (annually vs quarterly), accounting for the small reduction. See Table 4.

Table 4: Component 4 – Reminders in the Workplace

Indicator	Max	Mean (range)	%
Hand hygiene indication posters	25	25	100
Correct ABHR use posters	15	15	100
Correct handwashing technique posters	10	10	100
Systematic poster audit & replacement	15	11 (10–15)	73
Additional hand hygiene posters	10	10	100
Hand hygiene leaflets	10	10	100
Other reminders (screensavers, badges, stickers)	15	15	100
Total	100	96	96

Component 5: Institutional Safety Climate

Mean score 40/100 (range 0–100). While all participants confirmed a dedicated hand hygiene team existed (as a sub-committee of infection control) and that senior leadership (CEO, Medical Director, Director of Nursing) had made clear commitments, no participant knew whether the team met regularly or had dedicated time for hand hygiene

promotion. No participant was aware of a plan for WHO Hand Hygiene Day (5 May), any system for hand hygiene champions or role models, or any formal patient engagement programme. Local continuous improvement initiatives were limited to communications mentioning hand hygiene and a buddy system for new employees. See Table 5.

Table 5: Component 5 – Institutional Safety Climate

Indicator	Max	Mean (range)	%
A dedicated hand hygiene team exists	5	5	100
Regular team meetings (≥ monthly)	5	0	0
Dedicated time for hand hygiene promotion	5	0	0
CEO commitment	10	10	100
Medical Director's commitment	5	5	100
Director of Nursing commitment	5	5	100
Plan for the WHO 5th May initiative	10	0	0
Hand hygiene champion system	5	0	0

Role model recognition system	5	0	0
Patient information on hand hygiene	5	5	100
Formal patient engagement programme	10	0	0
Local continuous improvement initiatives	30	10 (0–10)	33
Total	100	40	40

Overall score and level classification

The facility achieved a total score of 327.5 out of 500, corresponding to the Intermediate (Consolidation) level. Component scores ranged from a high of 96/100 for Reminders in the Workplace to a low of 27.5/100 for Evaluation and Feedback, highlighting substantial variation in system readiness across the five domains (Table 6).

Table 6: Overall WHO Hand Hygiene Self-Assessment Framework scores by component

Component	Score (/100)
System Change	84
Training and Education	80
Evaluation and Feedback	27.5
Reminders in the Workplace	96
Institutional Safety Climate	40
TOTAL	327.5

According to the WHO classification, a total score of 327.5 falls within 251–375 → Intermediate (Consolidation) level. This indicates that an appropriate hand hygiene promotion strategy is in place and that hand hygiene practices have improved relative to a Basic level, but long-term planning is required to sustain and advance progress.

Pictorial findings (summary)

Photographs taken during the survey (see [supplementary file](#)) confirmed: infection control notice boards, alcohol-based hand rub at every patient room entrance, sinks with liquid soap and disposable towels, and posters illustrating the “My 5 Moments for Hand Hygiene”. No pictures of direct observation or feedback sessions existed – consistent with the low score in Component 3.

Discussion

Main finding in the context of system assessment

Using the WHO Hand Hygiene Self-Assessment Framework, Enaya Specialised Care Centre achieved an Intermediate (Consolidation) level (327.5/500). This means the facility has established the core components of a hand hygiene promotion system: near-universal availability of products (System Change 84/100), mandatory training (80/100), and abundant workplace reminders (96/100). These are essential foundations. However, the facility falls short in Evaluation and Feedback (27.5/100) and Institutional Safety Climate (40/100) – domains that measure the reinforcement and sustainability of hand hygiene behaviour.

Critically, this assessment measures system readiness, not directly observed hand hygiene compliance. No participant knew the facility’s actual compliance rate because direct observation was irregular and feedback was absent. Thus, while the facility is well-resourced, it lacks the behavioural

monitoring loop necessary to translate infrastructure into consistent practice.

Comparison with the literature

The pattern observed, strong infrastructure and training but weak monitoring and feedback, is consistent with international findings. A Cochrane review of 26 studies found that interventions providing performance feedback were more effective than those that did not, yet feedback was implemented in fewer than half of the studies (6). In long-term care settings specifically, a 2021 systematic review reported median hand hygiene compliance of only 48%, with the absence of routine observation and feedback cited as the most common barrier (7).

In the Gulf region, comparable data are sparse. A study from a Saudi tertiary hospital reported that while 95% of staff knew hand hygiene indications, observed compliance was only 54%, and performance feedback was provided to fewer than 30% of staff (14). Our findings align with this dissociation between knowledge/infrastructure and actual behaviour.

Why did the Evaluation and Feedback score so low?

The near-zero score in Component 3 reflects three interconnected gaps:

1. No routine direct observation – participants reported irregular observation, meaning no reliable denominator for compliance.
2. No immediate feedback – even if observations occurred, results were not shared with frontline staff.
3. No knowledge of facility compliance rate – staff were unaware of their own performance.

These gaps are not merely administrative; they are behavioural. Feedback is a core element of behaviour change

theory (15). Without it, even well-intentioned staff cannot correct errors or sustain improvements.

Safety climate gaps: from infrastructure to culture

Component 5 scored 40/100 because, while leadership commitment was acknowledged (a necessary condition), there were no visible, recurring actions that translate commitment into culture. A hand hygiene team existed on paper but did not meet regularly. There were no champions, no role model recognition, no annual WHO Day plan, and no formal patient engagement. These are low-cost, high-impact interventions that signal that hand hygiene is an organisational priority, not just an individual responsibility (16).

Implications for practice and quality improvement

For facility managers and infection control teams, the message is clear: infrastructure and training are necessary but insufficient. The next step from the Intermediate to the Advanced level requires closing the monitoring-feedback loop. Specific, actionable recommendations derived directly from the lowest-scoring indicators include:

1. Implement systematic direct observation – at least quarterly, using the WHO “My 5 Moments” tool, with trained and validated observers (addressing Indicator 3.4 and 2.4).
2. Provide immediate, non-punitive feedback – share results with frontline staff after each observation session (addressing 3.5).
3. Establish hand hygiene champions and role models – designate at least one champion per ward; publicly recognise exemplary practice (addressing 5.4).
4. Formalise WHO Hand Hygiene Day (5 May) observance – plan an annual event with bedside education and leadership walkarounds (addressing 5.3).
5. Launch a patient engagement programme – provide patients with simple scripts to remind staff to clean hands (addressing 5.5).
6. Monitor ABHR consumption indirectly – track litres per 1,000 patient-days as a proxy for compliance (addressing 3.3).

These interventions are evidence-based and low-cost. Their implementation would likely raise the facility’s HHSAF score into the Advanced range (376–500) within 12–18 months.

Study Limitations

Several substantial limitations should guide the reader’s interpretation of this study. First, the WHO Hand Hygiene Self-Assessment Framework measures system readiness, not directly observed hand hygiene behaviour; therefore, a high score does not guarantee high compliance, although the very low score in Evaluation and Feedback strongly suggests that compliance is not being systematically measured or reinforced. Second, while the HHSAF is designed for facility-level self-assessment and does not require large

samples, the small sample of ten respondents may not capture variation across all wards and shifts; however, the high consistency of responses (for example, all ten reporting irregular observation) indicates that the findings are robust for the indicators where consensus was reached. Third, self-report and social desirability bias are possible: participants may have over-reported infrastructure availability or training completeness. We attempted to mitigate this by conducting assessments privately and ensuring anonymity, but bias cannot be ruled out. Fourth, this is a single-facility study, so findings may not generalise to other long-term care facilities in Qatar or the Gulf region, particularly those with fewer resources or different accreditation status. Fifth, the data date from 2016 and are now nearly a decade old; hand hygiene practices, infection control protocols, and accreditation standards have evolved. These findings are presented as a historical baseline that informed subsequent quality improvement and should not be interpreted as current practice without updated assessment. Sixth, we did not conduct concurrent direct observation of hand hygiene compliance, which would have allowed comparison between the system score and actual behaviour. Seventh, the study captures only the nursing perspective; the views of physicians, allied health professionals, support staff, and patients were not included. Hand hygiene is a multidisciplinary behaviour, and other groups may have different barriers or perceptions.

Future research directions

Given these limitations, future research should: (1) repeat the HHSAF at this facility to measure progress over time; (2) conduct multi-centre studies across all long-term care facilities in Qatar to establish regional benchmarks; (3) include direct observation of hand hygiene compliance alongside HHSAF to validate the correlation between system scores and actual behaviour; (4) involve all healthcare worker categories and patients; and (5) evaluate the effectiveness of specific interventions (e.g., champions, patient engagement) using quasi-experimental designs.

Conclusion

This baseline assessment using the WHO Hand Hygiene Self-Assessment Framework revealed that Enaya Specialised Care Centre, a JCI-accredited long-term facility in Qatar, operates at the Intermediate (Consolidation) level (327.5/500). The facility has strong infrastructure (System Change 84/100), mandatory training (80/100), and abundant workplace reminders (96/100). However, it has critical gaps in Evaluation and Feedback (27.5/100) and Institutional Safety Climate (40/100), domains that measure behavioural reinforcement, not just resource availability. Direct observation of hand hygiene is irregular, feedback to frontline staff is absent, hand hygiene champions do not exist, and patient engagement is informal. To reach the Advanced level, the facility must implement routine direct observation, provide immediate non-punitive

feedback, establish champion and role model programmes, formally observe WHO Hand Hygiene Day, and launch patient engagement initiatives. These changes are evidence-based, low-cost, and directly address the lowest-scoring indicators.

Readers should note that this study measured system readiness, not directly observed compliance. The findings serve as a historical baseline (2016) for quality improvement. Without systematic monitoring and feedback, even excellent infrastructure cannot guarantee sustained hand hygiene behaviour. Closing the feedback loop is the single most important step toward embedding a sustainable safety culture.

Abbreviations

ABHR: Alcohol-Based Hand Rub
 CDC: Centres for Disease Control and Prevention
 GCC: Gulf Cooperation Council
 HCAI: Healthcare-Associated Infection
 HCW: Healthcare Worker
 HHSAF: Hand Hygiene Self-Assessment Framework
 HMC: Hamad Medical Corporation
 IPSG: International Patient Safety Goals
 JCI: Joint Commission International
 WHO: World Health Organisation

Declarations

Ethics Approval and Consent to Participate: Ethical approval was obtained from the Hamad Medical Corporation Institutional Review Board (approval # HMC IRB 2016 123). Written informed consent was obtained from all participants. The study complied with the Declaration of Helsinki.

Data Availability: The anonymised dataset generated and analysed during the current study is available from the corresponding author on reasonable request.

Competing Interests: The authors declare no competing interests. The study was conducted independently without any commercial or financial relationships that could influence the findings.

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Author contributions: The authors' contributions are as follows: OCMA conceptualised the study, developed the methodology, conducted the investigation and formal analysis, and wrote the original draft of the manuscript. OOO contributed to the validation of the data, assisted with the interpretation of results, and critically revised the manuscript for important intellectual content. AAA revised the manuscript. All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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