
**AN OBSERVATIONAL STUDY TO ASSESS COMPLIANCE WITH
THE WHO FIVE MOMENTS FOR HAND HYGIENE AMONG
HEALTHCARE WORKERS IN ACUTE MEDICAL-SURGICAL
WARDS OF A TERTIARY CARE HOSPITAL**

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Abstract

Introduction: Hand hygiene is a cornerstone of infection prevention and control and is one of the most important measures for reducing the transmission of healthcare-associated infections (HAIs). The hands of healthcare workers can serve as a major vehicle for the transmission of pathogenic microorganisms within healthcare settings. Despite the established importance of hand hygiene, compliance among healthcare workers remains suboptimal.

Materials and Methods: A prospective observational study was conducted over a two-month period in the acute medical and surgical wards of a tertiary care hospital. Twenty observation sessions, each lasting 20–30 minutes, were conducted using the World Health Organization (WHO) Hand Hygiene Observation Tool based on the WHO Five Moments for Hand Hygiene. During each session, opportunities for hand hygiene were identified, and the corresponding hand hygiene actions performed by healthcare workers were recorded. Hand hygiene compliance was calculated by comparing the number of hand hygiene actions performed with the total number of observed hand hygiene opportunities.

Results: A total of 139 hand hygiene opportunities were observed. The overall hand hygiene compliance rate among healthcare workers was 56.98%. Compliance was higher among nursing staff (59.37%) than among nursing students (54.44%). Compliance varied across the WHO Five Moments for Hand Hygiene. The highest compliance was observed after risk of

exposure to body fluids (88.88%), followed by before a clean/aseptic procedure (66.66%) and after touching a patient (66.66%). Lower compliance was observed after touching patient surroundings (47.05%), while the lowest compliance was recorded before touching a patient (30.23%).

Conclusion: The findings demonstrate suboptimal hand hygiene compliance among the observed healthcare workers, particularly before patient contact. The baseline findings emphasize the need for regular education, direct observation, feedback, and continuous quality-improvement initiatives to strengthen adherence to recommended hand hygiene practices and reduce the risk of healthcare-associated infections.

Keywords: Hand Hygiene; Five Moments for Hand Hygiene; Hand Hygiene Compliance; Healthcare Workers; Infection Prevention and Control; Healthcare-Associated Infections

INTRODUCTION

Most microorganisms responsible for healthcare-associated infections are transmitted through human activities and interactions. Hand hygiene is recognized as a cornerstone of infection prevention and control, and the hands of healthcare workers (HCWs) can serve as an important vehicle for the transmission of microorganisms between patients and the healthcare environment.¹ Hand hygiene is one of the most effective measures for reducing the transmission of pathogens in healthcare settings and has been associated with a reduction in healthcare-associated infections (HAIs).^{1,2}

Healthcare workers may contaminate their hands or gloves with pathogenic microorganisms, including Gram-negative bacilli, *Staphylococcus aureus*, enterococci, and *Clostridioides difficile*, during routine patient care. Such contamination can occur even during apparently clean procedures and following contact with the intact skin of hospitalized patients.^{3,4} When appropriate hand hygiene is not performed, contaminated hands may subsequently transmit microorganisms to other patients, healthcare workers, or environmental surfaces.

The World Health Organization (WHO) developed the “My Five Moments for Hand Hygiene” approach to identify the critical indications for hand hygiene during healthcare delivery. These five moments are: (1) before touching a patient, (2) before a clean/aseptic procedure, (3) after body fluid exposure risk, (4) after touching a patient, and (5) after touching patient surroundings.^{1,5}

Despite the simplicity and established effectiveness of hand hygiene, compliance among healthcare workers remains suboptimal in many healthcare settings. Erasmus et al., in a systematic review, reported considerable variation in hand hygiene compliance across healthcare settings, with compliance generally lower before patient contact than after patient contact.⁶ Pittet et al. demonstrated that improvement in hand hygiene adherence was associated with a reduction in healthcare-associated infections.⁷

The pattern of compliance across the five moments is clinically important. Hand hygiene before patient contact primarily contributes to protecting the patient from microorganisms that may be carried by the healthcare worker, whereas hand hygiene after patient contact and after body fluid exposure risk also contributes to protecting healthcare workers and preventing contamination of the healthcare environment.^{1,5} Therefore, direct observation of hand hygiene opportunities using a standardized observation tool can help identify specific gaps in practice and guide targeted infection-prevention interventions.

The present study was undertaken to assess hand hygiene compliance according to the WHO Five Moments for Hand Hygiene among healthcare workers in acute medical-surgical wards and to compare compliance across different categories of healthcare workers and individual

hand hygiene moments.

OBJECTIVES

Primary Objective

To assess the compliance rate of healthcare workers with the WHO Five Moments for Hand Hygiene during patient care.

Secondary Objectives

1. To compare hand hygiene compliance rates among different categories of healthcare workers.
2. To compare hand hygiene compliance rates across the five moments of hand hygiene.

STUDY DESIGN

An open, standardized, non-participatory observational study was conducted to assess hand hygiene practices during routine patient care.

MATERIALS AND METHODS

Study Setting and Observation Period

Twenty observation sessions were conducted in the acute medical and surgical wards of a tertiary care hospital over a period of two months. Each observation session lasted approximately 20–30 minutes.

Observation Tool

Hand hygiene compliance was assessed using the World Health Organization (WHO) Hand Hygiene Observation Tool, based on the WHO “My Five Moments for Hand Hygiene” framework.^{1, 5}

During each observation session, hand hygiene opportunities arising during routine patient care were identified and recorded. For each observed opportunity, the corresponding hand hygiene action performed by the healthcare worker was documented.

Observed Hand Hygiene Moments

The following five moments were observed:

1. Before touching a patient
2. Before a clean/aseptic procedure
3. After body fluid exposure risk
4. After touching a patient
5. After touching patient surroundings

Assessment of Hand Hygiene Compliance

Hand hygiene compliance was determined by calculating the proportion of observed hand hygiene opportunities in which the recommended hand hygiene action was performed.

The compliance rate was calculated using the following formula:

Hand Hygiene Compliance (%) =

$$\frac{\text{Number of hand hygiene actions performed}}{\text{Total number of observed hand hygiene opportunities}} \times 100$$

Total number of observed hand hygiene opportunities

The resulting percentage was used to describe the overall hand hygiene compliance and compliance across individual healthcare worker categories and the five WHO hand hygiene moments.

RESULTS

A total of 186 hand hygiene opportunities were observed during the 20 observation sessions

conducted in the acute medical-surgical wards. Healthcare workers performed hand hygiene on 107 of the 186 observed opportunities, resulting in an overall hand hygiene compliance rate of 57.52%.

Among the observed healthcare workers, the compliance rate was 59.37% among nursing staff and 54.44% among nursing students.

Hand Hygiene Compliance According to the Five Moments

Hand hygiene compliance varied across the five moments of hand hygiene. The highest compliance was observed after body fluid exposure risk (88.88%), followed by before a clean/aseptic procedure (66.66%) and after touching a patient (66.66%). Compliance after touching patient surroundings was 47.05%, whereas the lowest compliance was observed before touching a patient (30.23%).

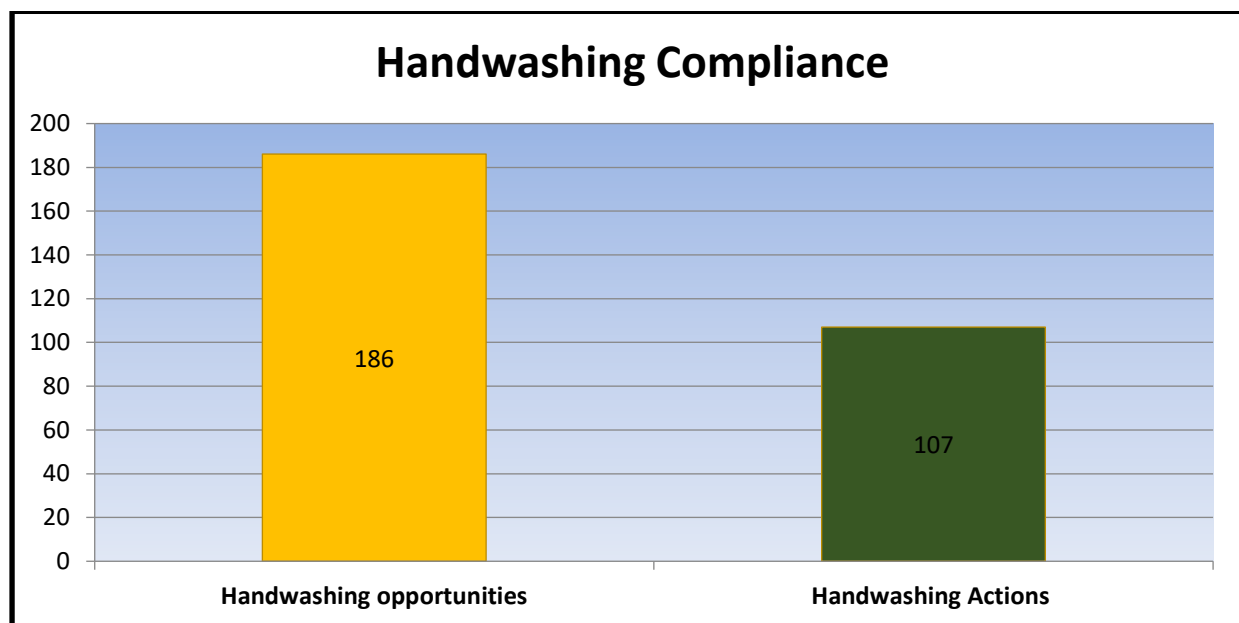


Figure 1: Overall Hand Hygiene Compliance During Observed Hand Hygiene Opportunities

Figure 1 illustrates the overall hand hygiene compliance among healthcare workers in the acute medical-surgical wards. Of the 186 observed hand hygiene opportunities, hand hygiene was performed on 107 occasions, resulting in an overall compliance rate of 57.52%.

Thus, hand hygiene was not performed during 79 of the 186 observed opportunities, indicating a substantial gap in adherence to recommended hand hygiene practices.

Figure 2: Hand Hygiene Compliance During Each Observation Session

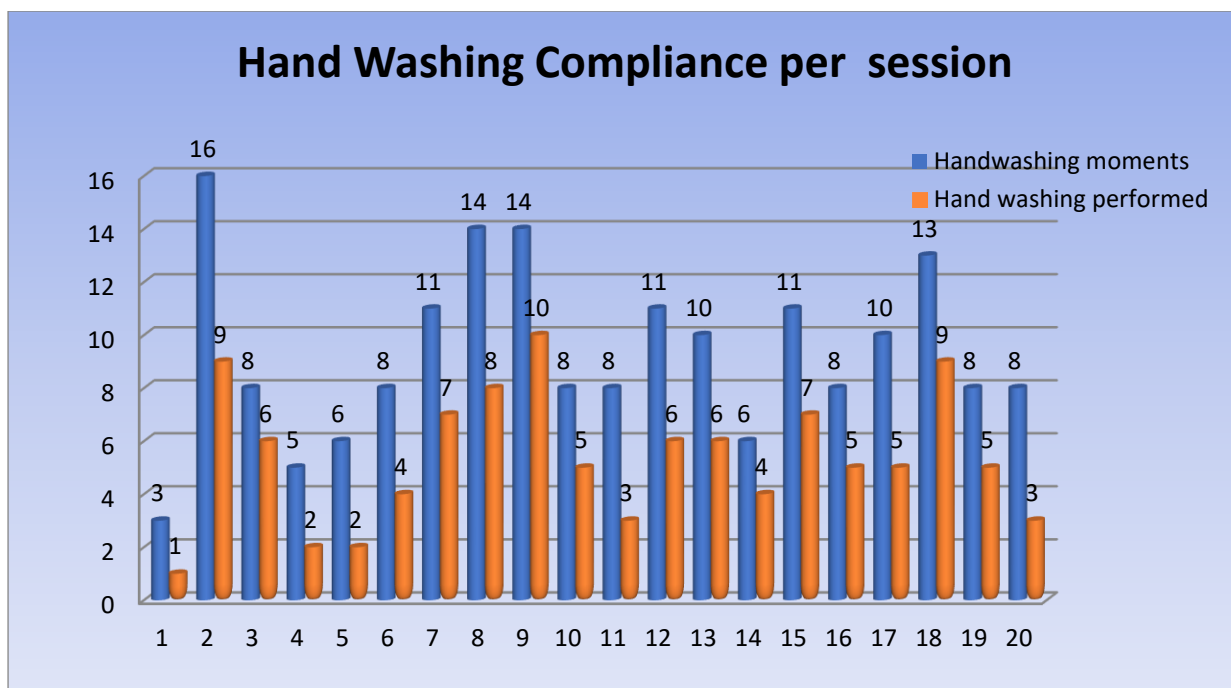


Figure 2: Bar diagram showing Hand washing Compliance per each observatory session by health care workers.

Figure 2 presents the number of hand hygiene opportunities observed and the corresponding number of hand hygiene actions performed during each of the 20 observation sessions conducted in the medical-surgical wards.

Considerable variation in compliance was observed across the individual observation sessions. The highest compliance was recorded during Session 3 (75.0%), followed by Session 9 (71.4%) and Session 18 (69.2%). Relatively higher compliance was also observed during Session 14 (66.7%), Sessions 7 and 15 (63.6% each), and Sessions 10, 16, and 19 (62.5% each).

Overall, the findings demonstrate session-to-session variability in hand hygiene compliance. No consistent increasing or decreasing trend was observed across the 20 observation sessions. The variation may reflect differences in the type and intensity of patient-care activities occurring during individual observation periods.

Figure 3: Hand Hygiene Compliance Among Nursing Staff According to the Five Moments of Hand Hygiene

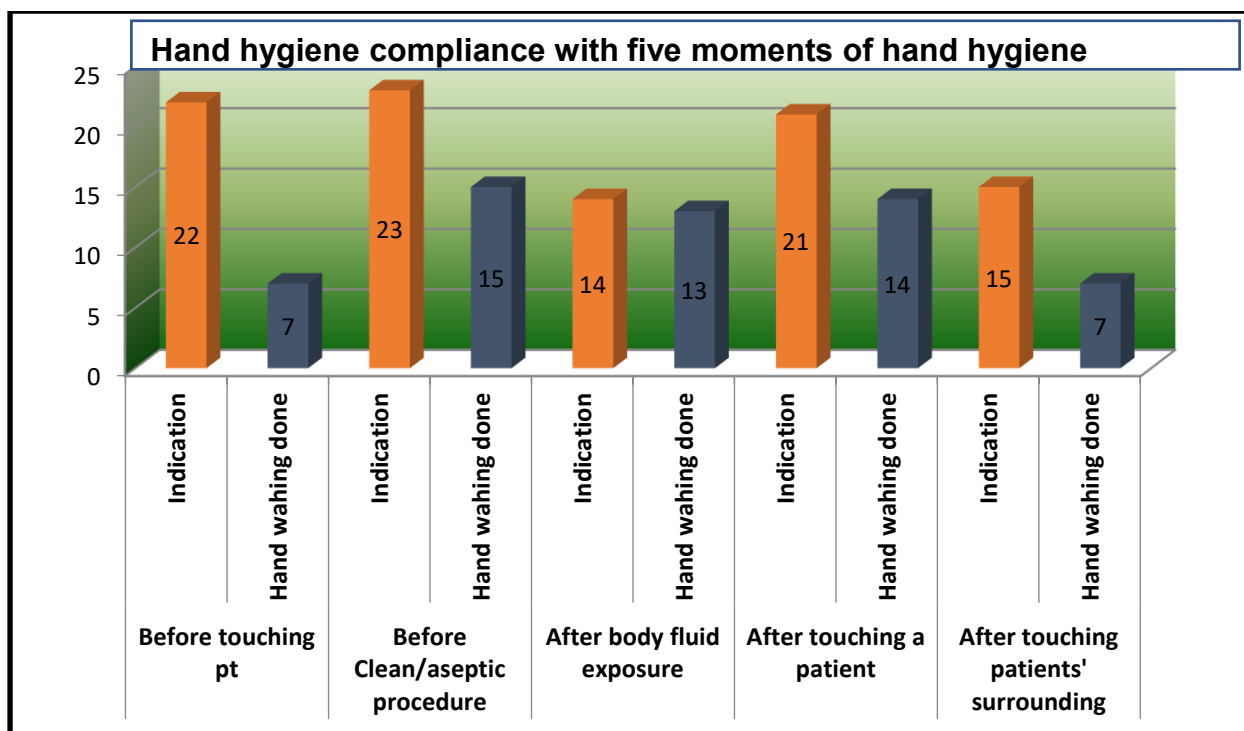


Figure 3 Hand Hygiene Compliance by Nursing Staff According to the Five Moments of Hand Hygiene

Figure 3 illustrates hand hygiene compliance among nursing staff according to the WHO Five Moments for Hand Hygiene.

Compliance varied considerably across the five moments. The highest compliance among nursing staff was observed after body fluid exposure risk (92.85%), whereas the lowest compliance was observed before touching a patient (31.81%).

Hand hygiene compliance after touching a patient was 14 of 21 opportunities (66.67%), compared with 7 of 22 opportunities (31.81%) before touching a patient. Compliance after touching patient surroundings was 46.6%, indicating lower adherence compared with several other hand hygiene moments.

The findings demonstrate that compliance differed substantially according to the specific hand hygiene indication, with particularly low adherence observed before patient contact.

DISCUSSION

The present study demonstrated an overall hand hygiene compliance rate of 57.52% among the observed healthcare workers, indicating substantial room for improvement in adherence to the WHO Five Moments for Hand Hygiene. Hand hygiene compliance has been reported to vary considerably across healthcare settings, professional groups, and specific hand hygiene indications. Erasmus et al., in a systematic review, reported substantial variability in compliance and observed that adherence was generally lower before patient contact than after patient contact.⁶

In the present study, the highest compliance among nursing staff was observed after body fluid exposure risk (92.85%), whereas the lowest compliance was observed before touching a patient (31.81%). This pattern is consistent with previous observational research showing that healthcare workers tend to demonstrate higher adherence following situations associated with

an obvious risk of contamination than before patient contact.^{6,8}

The relatively high compliance after body fluid exposure risk may be associated with greater recognition of contamination and occupational exposure during such situations. In contrast, lower compliance before patient contact may reflect reduced recognition of the need for hand hygiene when there is no immediately apparent contamination. The distinction is clinically important because hand hygiene before touching a patient is intended primarily to prevent the transmission of microorganisms to the patient.^{1,5}

The present study also demonstrated higher compliance after touching a patient (66.66%) than before touching a patient (31.81%). Similar differences between hand hygiene before and after patient contact have been reported in previous observational studies.^{6,8} These findings may indicate that healthcare workers are more likely to perform hand hygiene when contamination is more readily perceived following patient contact, whereas the preventive importance of hand hygiene before patient contact may be less consistently recognized.

Compliance after touching patient surroundings was 46.6%, representing another important area for improvement. Patient-care environments and frequently touched surfaces can become contaminated with microorganisms and may contribute to transmission through the hands of healthcare workers.^{1,5} Therefore, adherence to hand hygiene after contact with the patient environment remains an important component of infection prevention.

The observed compliance rate among nursing staff was 59.37%, compared with 54.44% among nursing students. Although the observed compliance rate was higher among nursing staff, this difference should not be interpreted as statistically significant without an appropriate statistical analysis. The significance of the difference should be determined using a suitable test based on the underlying observation-level data.

Evidence from intervention studies supports the importance of sustained hand hygiene improvement programmes. Pittet et al. demonstrated that a hospital-wide programme aimed at improving hand hygiene adherence was associated with improved compliance and a reduction in healthcare-associated infections.⁷ The WHO recommends a multimodal hand hygiene improvement strategy incorporating system change, education and training, evaluation and feedback, reminders in the workplace, and an institutional safety climate.^{1,9}

The findings of the present study therefore support the need for continuous education, regular observation and audit, timely feedback, adequate availability of hand hygiene facilities, and targeted interventions addressing specific hand hygiene moments. Particular attention should be directed towards hand hygiene before patient contact and after touching patient surroundings, where compliance was comparatively low.

Because this was an observational study, the findings describe hand hygiene behaviour during the observed sessions and should not necessarily be generalized to all healthcare workers or all clinical situations. Nevertheless, direct observation provides useful information about specific compliance gaps and can serve as a baseline for subsequent quality-improvement initiatives.

RELEVANCE TO CLINICAL PRACTICE

Hand hygiene is a fundamental component of infection prevention and patient safety. The findings of the present study highlight the importance of addressing compliance gaps at specific points of patient care rather than relying solely on general hand hygiene education.

Healthcare institutions should consider incorporating:

- Regular direct observation of hand hygiene practices.
- Periodic hand hygiene audits with constructive feedback.
- Continuing education and competency-based training.
- Visual reminders highlighting the WHO Five Moments for Hand Hygiene.

- Easy accessibility of alcohol-based hand rubs and appropriate handwashing facilities.
- Targeted interventions for moments associated with lower compliance.
- Ongoing monitoring to assess the sustainability of improvement.

Particular emphasis should be placed on hand hygiene before patient contact and after touching patient surroundings, as these represented important areas of non-compliance in the present study.

A sustained multimodal approach can support a culture of patient safety and contribute to improved infection prevention and quality of care.^{1,9}

CONCLUSION

The study demonstrated an overall hand hygiene compliance rate of 57.52%, with considerable variation across the five WHO moments for hand hygiene. The highest observed compliance among nursing staff was after body fluid exposure risk, whereas the lowest compliance was observed before touching a patient.

The findings indicate that general hand hygiene education should be complemented by a moment-specific approach that focuses on hand hygiene indications associated with lower compliance. Targeted education, practical demonstrations, regular observation, and feedback may help reinforce appropriate hand hygiene behaviour and strengthen infection prevention practices.

Continuous monitoring of compliance can also provide healthcare institutions with a means of evaluating the effectiveness of interventions and identifying areas requiring further improvement.

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