



Original Article

Importance of Hand Hygiene in Healthcare a Retrospective Study at Pacific Medical College and Hospital, Udaipur

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ABSTRACT

Healthcare-associated infections are an important concern for patient safety, and hand hygiene is a central component of infection prevention. This study assessed hand hygiene compliance among hospital staff at Pacific Medical College and Hospital (PMCH), Udaipur, and examined changes across professional categories and over time. A retrospective observational study was undertaken using monthly monitoring records from the Infection Control Department for 1 July to 31 December 2022. The project was conducted from January to March 2023. Records covered doctors, nurses, Basic Sanitation Assistants (BSA) and other staff working in the included hospital units; two emergency departments were excluded. Compliance was calculated as the number of recorded hand hygiene actions divided by the number of hand hygiene opportunities, multiplied by 100. Data were analyzed descriptively using Microsoft Excel. Overall compliance increased from 74.52% in July to 82.00% in December, representing an absolute improvement of 7.48 percentage points. At baseline, compliance was highest among doctors (83.65%), followed by nurses (77.88%), BSA (70.19%) and other staff (63.88%). By December, the respective rates were 89.20%, 85.10%, 79.45% and 73.20%. All professional categories improved, with the largest absolute gains among other staff and BSA. The improvement coincided with ongoing training, monitoring and awareness activities. However, the descriptive retrospective design does not establish the independent effects of those activities. Sustained education, reliable access to hand hygiene supplies, regular feedback and targeted support for groups with lower compliance are indicated.

Keywords: Hand hygiene; compliance; healthcare-associated infections; infection control; retrospective study; alcohol-based hand rub.

INTRODUCTION

Hand hygiene is a basic infection prevention practice in healthcare settings. The hands of healthcare workers can transfer microorganisms during patient contact and contact with the surrounding environment. Performing hand hygiene at the appropriate time is therefore necessary to interrupt transmission. The World Health Organization (WHO) guidelines provide recommendations for healthcare workers, administrators and health authorities and support a systematic approach to improving practice [1].

Compliance depends on more than knowledge of handwashing technique. Staff must recognize when hand hygiene is required and have access to suitable products during routine care. The WHO “My Five Moments for Hand Hygiene” approach identifies opportunities before touching a patient, before a clean or aseptic procedure, after a risk of body fluid exposure, after touching a patient, and after touching the patient’s surroundings. These moments provide a common framework for education and observation [1].

Educational approaches have received considerable attention. Martos-Cabrera and colleagues reviewed 17 clinical trials involving 5,747 nurses and nursing students. Their review described the use of practical simulations, videos, audiovisual teaching and reminders to improve compliance. The findings support combining instruction with opportunities to practise and reinforce the required behaviors, while recognizing that adherence can vary between clinical settings [2].

Lambe and colleagues reviewed hand hygiene compliance in intensive care units and found variation across geographical regions, unit types and professional groups. Such variation indicates that a single hospital-wide percentage may conceal differences in practice. Comparing staff categories can help identify where additional support is needed, although comparisons between institutions must account for differences in observation methods and the clinical environments included [3].

PMCH, Udaipur, is described in the project report as a 900-bed tertiary care teaching hospital with a Hospital Infection Control Committee and an Infection Control Department conducting training and audits. The present study examined monthly compliance records to assess the status of hand hygiene practice and identify changes during a six-month period. Its objectives were to assess overall compliance, examine month-wise trends, compare doctors, nurses, BSA and other staff, and identify practical measures for improvement.

MATERIAL AND METHODS

A retrospective observational study was conducted using hand hygiene monitoring records maintained by the Infection Control Department of PMCH, Udaipur. The project period was January to March 2023, and the records analyzed covered 1 July to 31 December 2022. The unit of analysis was the recorded hand hygiene opportunity and corresponding action, summarized by month and professional category. The study used existing hospital monitoring information rather than introducing a new experimental intervention.

The included records related to hospital staff working in wards, intensive care units, operating theatres and outpatient departments. Personnel were categorized as doctors, nurses, Basic Sanitation Assistants and other staff. Two emergency departments were excluded because consistent monitoring data were unavailable. Visitors and patient attendants were also excluded. The analysis covered the available eligible records for the six-month period.

The hospital’s manual monitoring process used a hand hygiene observation tool based on the WHO Five Moments framework. Infection control nurses observed opportunities during routine patient care across selected shifts and recorded hand hygiene actions. Alcohol-based hand rub and soap were the products described in the hospital monitoring process. Monthly records were used to summarize practice across the included staff categories [1].

Data were entered into Microsoft Excel and analyzed using descriptive statistics. Hand hygiene compliance was calculated as: $\text{compliance (\%)} = (\text{number of hand hygiene actions} / \text{number of hand hygiene opportunities}) \times 100$. Monthly overall percentages and profession-wise percentages were presented in tables. Absolute change was expressed in percentage points by subtracting the July rate from the December rate. No inferential statistical testing was reported; consequently, the observed differences are described without claims of statistical significance.

The project report states that ethical approval was obtained from the Institutional Review Board or Ethics Committee of PMCH, Udaipur. The study involved retrospective review of the hospital’s existing infection control monitoring records.

RESULTS

At baseline in July 2022, overall hand hygiene compliance was 74.52%. Doctors had the highest compliance at 83.65%, followed by nurses at 77.88%, BSA at 70.19% and other staff at 63.88%. Table 1 presents the baseline distribution. The difference between doctors and other staff indicates variation in recorded compliance across professional categories.

Table 1. Hand hygiene compliance in July 2022

Staff category	Compliance (%)
Doctors	83.65
Nurses	77.88

Staff category	Compliance (%)
Basic Sanitation Assistants	70.19
Other staff	63.88
Overall compliance	74.52

Overall compliance increased during each successive month, from 74.52% in July to 76.14% in August, 77.89% in September, 79.31% in October, 80.75% in November and 82.00% in December. The July-to-December increase was 7.48 percentage points. These monthly values are shown in Table 2.

Table 2. Month-wise overall hand hygiene compliance

Month	Overall compliance (%)
July 2022	74.52
August 2022	76.14
September 2022	77.89
October 2022	79.31
November 2022	80.75
December 2022	82.00

All four staff categories had higher compliance in December than in July. Doctors improved by 5.55 percentage points, nurses by 7.22, BSA by 9.26 and other staff by 9.32. Although doctors retained the highest compliance at the end of the observation period, the largest absolute improvement occurred among other staff. The comparison is presented in Table 3.

Table 3. Staff-wise compliance in July and December 2022

Staff category	July (%)	December (%)	Increase (percentage points)
Doctors	83.65	89.20	5.55
Nurses	77.88	85.10	7.22
Basic Sanitation Assistants	70.19	79.45	9.26
Other staff	63.88	73.20	9.32

The overall and category-specific changes describe an improvement in recorded practice during the study period. They do not establish whether the magnitude of change differed statistically between groups or whether any single infection control activity caused the improvement.

DISCUSSION

The study identified a consistent increase in monthly hand hygiene compliance at PMCH, Udaipur, together with improvement in every staff category. The distinction between overall performance and professional-group performance is useful for service planning. An improving overall rate can coexist with continued gaps among particular groups, as shown by the lower December compliance among BSA and other staff.

Doctors had the highest recorded compliance in both July and December, followed by nurses, BSA and other staff. This professional ranking should be interpreted within the PMCH setting. Lambe and colleagues reported a different pattern across the ICU literature, including higher pooled compliance among nursing staff than physicians. Differences in clinical workload, the opportunities observed and monitoring practices may contribute to variation between studies. The PMCH findings should therefore guide local action without being treated as a universal ranking of professional behavior [3].

The improvement occurred during a period in which the Infection Control Department reportedly continued training, displayed educational posters, supported access to hand rub and provided feedback to departments. These activities are consistent with the combined educational approaches discussed by Martos-Cabrera and colleagues. However, the retrospective records do not separate the contributions of training, reminders, product availability or feedback. The findings support continued attention to these activities while avoiding attribution of the observed increase to a single measure [2].

The project also described practical barriers reported during staff interactions. These included workload, emergency situations, forgetfulness, skin dryness or irritation, and lack of hand rub at the bedside. Time constraints were reported among doctors, skin irritation among nurses, and limited knowledge of the Five Moments among BSA and other staff. These observations help identify areas for service improvement, but they were not presented as a separately quantified qualitative study. They should be used to guide focused inquiry and targeted support.

Direct observation provides information about the context in which hand hygiene is required, but behavior may change when staff know they are being observed. Observer interpretation can also influence recording. Iversen and colleagues evaluated the Sani nudge monitoring system in two Danish university hospitals using sensors on sanitizer dispensers, staff name tags and patient beds. Their study showed that automated monitoring could provide information about individual and group compliance. Such technology could be considered for continuous monitoring, subject to suitability for the hospital setting; the PMCH study itself did not compare manual and automated methods [4].

The relationship between hand hygiene and infection outcomes is central to the purpose of infection prevention. Pittet and colleagues reported a hospital-wide campaign in which improved compliance coincided with reductions in nosocomial infections and methicillin-resistant *Staphylococcus aureus* transmission. The PMCH analysis measured compliance rather than infection outcomes. It therefore cannot determine how many infections were prevented or quantify a reduction in healthcare-associated infections from the observed 7.48-percentage-point increase [5].

The results indicate several priorities for the hospital. Alcohol-based hand rub and handwashing facilities should be reliably available at points of care. Education should include orientation for newly joining staff, periodic refreshers and practical demonstrations, with additional attention to groups whose compliance remains lower. Feedback should be understandable, timely and linked to the work of individual departments. Posters and other reminders can reinforce the required moments, while attention to skin care can address a reported barrier. These measures should be supported by hospital leadership and incorporated into routine quality improvement activities [1].

The largest improvements among BSA and other staff suggest that these groups can make substantial progress while still requiring continued support. Training should be adapted to their work activities and the hand hygiene opportunities encountered during those tasks. Department-level review can help determine whether lower compliance reflects gaps in knowledge, supplies, workflow or monitoring coverage. Follow-up observation is needed to assess whether improvement is sustained beyond December 2022.

The main limitations are the retrospective design, the six-month observation period, exclusion of two emergency departments and reliance on manual monitoring. The report does not provide the underlying number of hand hygiene opportunities for each month and category, so the precision of the percentages and the weighting of overall rates cannot be independently assessed from these summaries. Technique and duration of hand hygiene were not evaluated, and compliance was not linked to infection rates. Prospective research including emergency departments, standardized observation denominators and patient outcomes would help address these limitations.

CONCLUSION

Hand hygiene compliance at PMCH, Udaipur, increased from 74.52% in July 2022 to 82.00% in December 2022, an absolute improvement of 7.48 percentage points. Doctors maintained the highest recorded compliance, while BSA and other staff demonstrated the largest absolute gains. The findings indicate improving practice during a period of ongoing infection control activity, with continuing scope for improvement across staff categories. Sustained training, accessible supplies, monitoring and feedback are appropriate priorities. Further follow-up is needed to determine whether the improvement persists and whether it is accompanied by better infection-related outcomes.

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