American Journal of Infection Control ■■ (2016) ■■-■■

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Original Research Article

Enhancement of hand hygiene compliance among health care workers from a hemodialysis unit using video-monitoring feedback

Laura Arelí Sánchez-Carrillo MD [a], Juan Manuel Rodríguez-López MD [a], Dionisio Ángel Galarza-Delgado MD [b], Laura Baena-Trejo MD [b], Magaly Padilla-Orozco MD [a], Lidia Mendoza-Flores MD [a], Adrián Camacho-Ortiz MD [a,*]

[a] *Coordinación de Epidemiología, Hospital Universitario "Dr. José Eleuterio González," Monterrey, Nuevo León, Mexico*
[b] *Departamento de Medicina Interna, Hospital Universitario "Dr. José Eleuterio González," Monterrey, Nuevo León, Mexico*

Key Words:
Hand hygiene
Hawthorne effect
hospital-acquired infections
video assistance

Background: The importance of hand hygiene in the prevention of health care–associated infection is well known. Experience with hand hygiene compliance (HHC) evaluation in hemodialysis units is scarce.
Methods: This study was a 3-phase, prospective longitudinal intervention study during a 5-month period in a 13-bed hemodialysis unit at a university hospital in Northern Mexico. The unit performs an average of 1,150 hemodialysis procedures per month. Compliance was evaluated by a direct observer and a video assisted observer. Feedback was given to health care workers in the form of educational sessions and confidential reports and video analysis of compliance and noncompliance.
Results: A total of 5,402 hand hygiene opportunities were registered; 5,201 during 7,820 minutes of video footage and 201 by direct observation during 1,180 minutes. Lower compliance during the baseline evaluation was observed by video monitoring compared with direct observation (P <0.05). Discrepancy between both methods was 29.2% (0.4%-59.8%); the average improvement in compliance during the study was 30.6% (range, 7.3%-75.5%). Global and Individual results for each subject revealed a statistically significant Improvement in the majority. Noncompliance according to WHO's 5 Moments for HH was greater for moment 5 (30.1%). We estimated that a health care worker in a hemodialysis unit could take 22-44.3% of working hours for proper hand hygiene compliance.
Conclusions: Video-assisted monitoring of hand hygiene is an excellent method for the evaluation of HHC in a hemodialysis unit; enhanced HHC can be achieved through a feedback program to the hemodialysis staff that includes video examples and confidential reports.

The importance of hand hygiene (HH) in the prevention of health care–associated infection (HAI) is well known; despite this knowledge, compliance among health care workers (HCWs) remains low.[1-7] The most common method for assessment of hand hygiene compliance (HHC) has been direct observation; however, it convenes the unavoidable bias of the Hawthorne effect. One of the main transmission mechanisms of bacteria-causing HAI is direct contact with contaminated HCWs' hands. As a consequence, other methods have been applied to improve HHC evaluation.[8] Experience with HHC evaluation in hemodialysis units (HUs) is scarce. Shimokura et al[9] evaluated self-reporting practices of HHC by hemodialysis health care personnel from multiple sites; the HCWs reported always washing their hands 46.7%-57.4% of the time, often washing their hands 26.4%-32.2% of the time, and sometimes washing their hands 11.5%-17.6% of the time. Another study[10] using direct observation found adherence to HH ranging from 13.8% before patient contact up to 35.6% after patient contact during the whole hemodialysis procedure. These studies could have been influenced by self-reporting bias and observation bias, respectively. Therefore, we sought to evaluate HHC before and after video-assisted feedback sessions to the HCW in the HU and compare the results with a traditional direct observation method.

MATERIALS AND METHODS

Study design

We designed a 3-phase prospective longitudinal intervention study during a 4-month period (February 5-May 22, 2015).

* Address correspondence to Adrián Camacho-Ortiz, MD, Servicio de Infectología, Coordinación de Epidemiología Hospitalaria, Hospital Universitario "Dr. José Eleuterio González", Universidad Autónoma de Nuevo León. Avenida Francisco I. Madero s/n, Colonia Mitras Centro, Monterrey, NL 64460, Mexico.
E-mail address: acamacho_md@yahoo.com (A. Camacho-Ortiz).
Conflicts of Interest: None to report.

0196-6553/
http://dx.doi.org/10.1016/j.ajic.2016.01.040

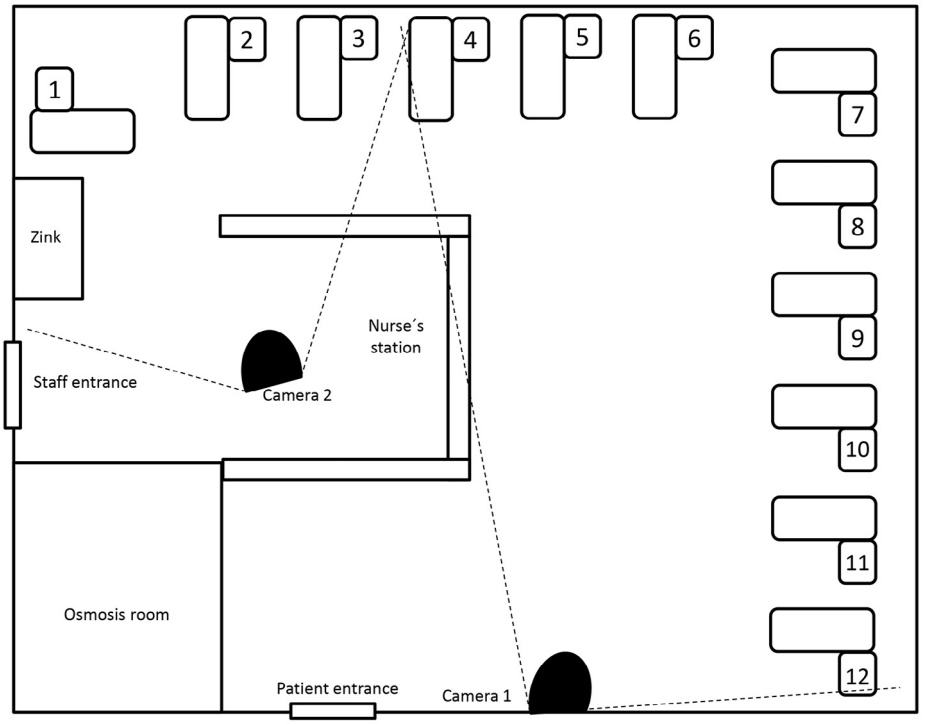

Fig 1. Schematic distribution of the number of beds in the hemodialysis units and the camera's visual field for hand hygiene compliance monitoring.

Setting

The study was conducted in the HU of the Hospital Universitario "Dr. José Eleuterio González" in Monterrey, Mexico, a 13-bed unit that performs an average of 1,150 hemodialysis procedures per month. There is an average of 4 nurses per shift, with a supervisor to nurse ratio of 3:1. There are also 4 attending nephrologists and 6-7 fellows.

Compliance monitoring

Two observers participated in the study. Before beginning the study they were adequately trained in the World Health Organization's (WHO's) My 5 Moments for HH, and they obtained concordance of at least 85% before the study. They evaluated HHC during the same study period without exchanging information between them until the end of the study.

The directed observer (DO) performed daily observations Monday through Friday for a period of 10-20 minutes daily at randomly selected periods during the morning and afternoon shifts. The DO did not evaluate HHC during night and weekend shifts.

The video-assisted observer (VAO) performed observations of live video or video recordings through cameras installed in the HU. Video-assisted monitoring of HHC was performed Monday through Friday making observations from randomly selected 10-minute lapses encompassing live recordings or video from the last 48 hours in order to monitor morning, afternoon, night, and weekend shifts.

Observations were focused on the HCWs of all shifts (morning, afternoon, and evening, including holidays and weekends). At least 1 monitoring session of 10 continued minutes was chosen randomly per day, per individual. This means that an individual was directly observed for at least 10 continuous minutes evaluating all of his or her hand hygiene opportunities (HHOs). Each HCW that had a regular working schedule inside the HD unit was assigned a subject number. A compilation of subjects sporadically in contact with the patients of the HU was tagged into a group denominated as others. To reduce bias, the VAO could not evaluate HHC in video sequences where the DO was present in the HU, and another randomly selected period had to be chosen.

Each HHO was stratified as compliant or noncompliant and was classified according to the WHO's My 5 Moments for HH as follows: (1) before touching a patient, (2) before an aseptic task, (3) after body fluid exposure risk, (4) after touching a patient, and (5) after contact with the patient's environment. Compliance was calculated by dividing the total HHOs for each subject by the number of HHCs $\times$ 100. Adequate technique for HH was evaluated by measuring time applied to complete HH, based on the usage of soap and water or alcohol-based handrub (between 40 and 60 seconds and 20 and 40 seconds, respectively). For the purpose of this study we defined HHC as an HHO adherent to the recommended WHO's My 5 Moments for HH and one that could be visualized clearly with an adequate technique.

Study phases

The installation of 2 strategically placed video cameras was completed during the last week of December 2014, with authorization from the head of the department and with knowledge of the whole HU personnel. From installation to the start of the study (>2 months), no observations were made and no feedback was given to the medical personnel (Fig 1).

Preintervention

Observational (4 weeks) HHC of the HU personnel was evaluated through video recording and by direct observations, without the staff's knowledge of being video monitored.

First feedback session

All HU medical staff were gathered, and video-assisted monitoring was explained during this session: (1) global percentages of