American Journal of Infection Control 41 (2013) 984-8

Contents lists available at ScienceDirect

American Journal of Infection Control

journal homepage: www.ajicjournal.org

Major article

A multicenter study using positive deviance for improving hand hygiene compliance

Alexandre R. Marra MD [a,b,*], Danilo Teixeira Noritomi MD [c], Adilson J. Westheimer Cavalcante MD [d], Thiago Zinsly Sampaio Camargo MD [a], Renata Puzzo Bortoleto MD [e], Marcelino Souza Durao Junior MD [a,b], Anucha Apisarnthanarak MD [f], Claudia Laselva MD [a], Walace de Souza Pimentel MD [a,b], Leonardo Jose Rolim Ferraz MD [a,g], Maria Fátima dos Santos Cardoso RN [a], Elivane da Silva Victor PhD [a], Oscar Fernando Pavão dos Santos MD [a,b], Miguel Cendoroglo Neto MD [a,b], Michael B. Edmond MD, MPH, MPA [h], and the Positive Deviance For Hand Hygiene Study Group†

[a] Hospital Israelita Albert Einstein, São Paulo, Brazil
[b] Universidade Federal de São Paulo (UNIFESP), São Paulo, Brazil
[c] Hospital Paulistano, São Paulo, Brazil
[d] Hospital Heliopolis, São Paulo, Brazil
[e] Hospital Municipal Dr Moysés Deutsch-MBoi Mirim, São Paulo, Brazil
[f] Thammasat University Hospital, Khlong Luang, Thailand
[g] Hospital Brigadeiro, São Paulo, Brazil
[h] Virginia Commonwealth University, Richmond, VA

Key Words:
Safety patient
Health care-associated infection

Background: Positive deviance (PD) can be a strategy for the improvement of hand hygiene (HH) compliance.
Methods: This study was conducted in 8 intensive care units and 1 ward at 7 tertiary care, private, and public hospitals. Phase 1 was a 3-month baseline period (from August to October 2011) in which HH counts were performed by observers using iPods (iScrub program). From November 2011 to July 2012, phase 2, a PD intervention was performed in all the participating centers. We evaluated the consumption of HH products (alcohol gel and chlorhexidine) and the incidence density of health care-associated infections.
Results: There was a total of 5,791 HH observations in the preintervention phase and 11,724 HH observations in the intervention phase (PD). A statistically significant difference was found in overall HH compliance with 46.5% in the preintervention phase and 62.0% in the PD phase ($P < .001$). There was a statistically significant reduction in the incidence of density of device-associated infections per 1,000 patient-days and also in the median of length of stay between the preintervention phase and the PD phase (13.2 vs 7.5 per 1,000 patient-days, respectively, $P = .039$; and 11.0 vs 6.8 days, respectively, $P < .001$, respectively).
Conclusion: PD demonstrated great promise for improving HH in multiple inpatient settings and was associated with a decrease in the median length of stay and the incidence of device-associated HAIs.

One of the most important interventions for reducing health care-associated infections (HAI) is hand hygiene (HH).[1-3] Many different strategies have been attempted, but health care worker (HCW) compliance with HH continues to be suboptimal.[4]

Positive deviance (PD) is a new tool that is being applied in organizations and communities where there are individuals or groups of people who solve problems better than colleagues who have exactly the same resources.[5-7] It enhances the sense of ownership of problems among HCWs. We previously showed that PD resulted in a significant improvement in HH, which was

* Address correspondence to Alexandre R. Marra, MD, Avenue Albert Einstein, 627 Bloco A1, 1o andar, Room 108, Morumbi, São Paulo 05651-901, Brazil.
E-mail address: alexandre.marra@einstein.br (A.R. Marra).
Conflicts of interest: None to report.
† The Positive Deviance for Hand Hygiene Study Group members are Mirian de Freitas Dalben, MD,[c] Claudia Garcia P. Fabíola, RN,[c] Maria Inês Bratfisch, RN,[d] Luci Correa, MD,[a,b] Denis Faria Moura Junior, RN,[a] Neide Marcela Lucinio, RN,[a] Maria Aparecida Alves, RN,[a] Vanessa Jonas Cardoso, RN,[a] Ícaro Boszczowski, MD,[e] Antonio Claudio do Amaral Baruzzi, MD,[e] Edimar Junio Sgoti, RN,[b] Eduardo Alexandrino Servolo Medeiros, MD,[b] Daniela Escudero, MD,[b] Uayporn Pinitchai, RN,[f] Lidiane Soares Sodre da Costa, RN,[a] Cristina Vogel, RN,[a] Julia Yaeko Kawagoe, RN,[a] Marcos Rodrigues Gouvêa, PhD,[a] and Patricia Rady Muller, MD.[g]

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http://dx.doi.org/10.1016/j.ajic.2013.05.013

associated with a decrease in the incidence of HAIs,[8] and this intervention has resulted in a sustained improvement in HH. However, these results were obtained at a single medical center and may not be generalizable to other centers.[2,8] The purpose of this study was to evaluate a PD strategy for improving HH in the setting of multiple hospitals.

METHODS

From August to October 2011, baseline rates of HH compliance and HAIs were established prior to the introduction of PD methodology in 9 different settings (8 intensive care units [ICUs] and 1 ward) in 7 hospitals. We decided to perform a PD intervention in these hospitals over a 9-month period (from November 2011 to July 2012).

Settings

The participating hospitals were the following: 2 private Brazilian hospitals in São Paulo, Brazil: Hospital Israelita Albert Einstein (adult medical/surgical ICU with 41 beds and hematology/oncology ward with 40 beds) and Hospital Paulistano (adult medical/surgical ICU with 20 beds); 4 public Brazilian hospitals in São Paulo, Brazil (a university hospital): Hospital São Paulo (adult nephrology ICU with 4 beds and adult cardiac surgery ICU with 8 beds), Hospital Heliopolis (adult medical/surgery with 9 beds), Hospital Municipal Dr Moysés Deutsch-MBoi Mirim (adult medical/surgery ICU with 20 beds), and Hospital Brigadeiro (adult transplant ICU with 8 beds); and a Thai university hospital in Pratumthani, Thailand: Thammsat University Hospital (adult medical/surgery ICU with 8 beds). The study was approved by each facility's institutional review board. HH compliance was measured by direct observation of practice and measurement of the volume of product utilized.

Measures

Direct observations

Prior to the start of the study, 20 nurses were trained by an infection control professional in HH observation. Training first addressed the concept of the "5 Moments for Hand Hygiene"; and, after that, to check the understanding of these concepts by the observers, we used videos from the World Health Organization (WHO), available free on its Web site (http://www.who.int/gpsc/media/training_film/en/). Validation of HH observations by the 20 ICU nurses was performed by having the nurses and the infection control professional observe HH performance in the same ICU pod concurrently and comparing their measured rates of compliance. Next, the nurses (while not on clinical duty) were directed to perform HH observations in 1 of the study pods for a 20-minute period per day, with random variation in the time of day of the observations (morning, afternoon, and night). The HH observations were done from Monday to Friday, except on their free days or holidays, for 12 months. These 20 nurses recorded the opportunities for HH and compliance on a handheld personal digital assistant (iPod; Apple Corp, Cupertino, CA) using an application (iScrub).[9] During these audits, the 20 nurses counted only HH opportunities that represented the points in time within the care process when HH should be performed, as specified by predefined indications (the WHO's "5 Moments for Hand Hygiene").[10] The observers did not evaluate the quality of HH performance. All HCWs (doctors, nurses, respiratory therapist, and other HCWs such as radiology technicians and laboratory technicians) who provided care in the unit were included in the HH observations. All observations took place between 8:00 AM and 8:00 PM on weekdays.

If questioned by an ICU HCW, the ICU nurse (not on clinical duty but dressed as if on clinical duty) explained that she was observing problems that needed to be corrected in the unit. To our knowledge, the ICU team never became aware that the nurses participating in the study were performing HH audits.

Product measurement

HCWs had the opportunity to perform HH by either the use of the available alcohol product or washing their hands with chlorhexidine liquid soap. The total volumes of alcohol gel and chlorhexidine used (liters/1,000 patient-days) were determined.

HAI surveillance

HAI surveillance was performed by trained infection preventionists using Centers for Diseases Control and Prevention definitions[11] in all units during the study. Length of stay, occupancy rate, nurse/patient ratio, and invasive device utilization ratios were calculated for the duration of the study.

PD

PD methodology was first introduced in November 2011 in the participating hospitals (intervention phase). PD in HH links what HCWs know and what they actually do during work shifts, and focuses on promoting compliance with HH at all opportunities by everyone who comes into contact with patients and their environment. Every frontline HCW has numerous opportunities for HH in caring for patients. They also are the very best on-site experts on what it is needed in their workplace to improve HH compliance. A PD meeting with all HCWs from the participating hospitals was performed twice monthly.

The rule is not only to talk or give lectures (about HH) but also provide the opportunity for the PDs to express their feelings about HH and to discuss among themselves what needs to be changed, what needs to be improved, and what is wrong or what is right (and needs to be followed as a good example). We encouraged them to invite another PD to the next meeting. HAI rates were shown monthly to the intervention units.

The process of PD for HH involved changing experiences, demonstrating how to improve HH practices, and discussing the best way to perform HH in the unit. PDs were defined as those HCWs who wanted to change, to think, to develop new ideas for improving HH, and who stimulated other HCWs (including physicians) to use the alcohol gel product. They organized meetings with all HCWs twice monthly. These meetings gave the PDs opportunities to express their feelings about HH, to discuss what needed to be improved, and to continue noting good examples. Besides changing the position of alcohol gel dispensers in the patient room and recommending a change in the pressure of the tap water, they decided to put alcohol gel dispensers in the corridors and to train all HCWs in HH performance. They were attentive not only to the quantity but also to the quality of HH.

In each hospital, the PDs had different ideas and strategies. For example, 1 person prepared a short theater presentation discussing "My 5 Moments for Hand Hygiene" (WHO Guidelines on HH in health care settings) with their peers; other PDs prepared badges for doctors who perform HH, noting them as exemplars; and another hospital prepared buttons labeled "Dr Bacteria" for HCWs who do not clean their hands, ever stimulating the discussion in a positive way.

The coordinators (the ICU chief or the hospital epidemiologist) from the PD multicenter study for HH from all the hospitals facilitated the discussion and gave the PDs opportunities to express their feelings about HH and to discuss what needs to be changed, what needs to be improved, what is wrong, or what is right (and