The Effect of Feedback Educational and “Staff Advocacy” Interventions on Hand Hygiene Compliance in a Hospital Setting

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Abstract

The purpose of this study was to determine if (a) an educational and feedback intervention and (b) a "staff advocacy" intervention aimed to increase a sense of “community responsibility” would increase compliance with hospital hand hygiene policy. The study was guided by Bandura’s Social Learning Theory, which proposes that learning and behavior result from interactions between the environment and person (Bandura, 1977). The setting was two medical-surgical units in a Midwest urban teaching hospital. Hand hygiene compliance was measured as (number of hand hygiene activities per room divided by room entries plus exits) * 100. Hand hygiene activity was measured with an electronic device. Average baseline compliance was 10.58%. Average compliance was 20.41% during the Feedback Phase II and 20.71% during Staff Advocacy Phase III. Hand hygiene compliance following both interventions reverted toward the baseline. The results of this study suggest that healthcare workers and visitors may be more inclined to comply with hospital hand hygiene policy if they feel they are being watched, rather than because they feel like they are part of a “team effort.”
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Hand hygiene encompasses both hand washing (cleaning hands with soap and water) and hand rubbing (cleaning hands with alcohol-based solutions). Both methods are effective in preventing infection (Swoboda et al., 2004). Despite researchers finding that hand hygiene is the single most important measure to prevent cross-transmission of microorganisms from one patient to another, adherence of healthcare personnel to hand hygiene recommendations is often poor (Rupp et al., 2007). The consequences of lower compliance ratings include healthcare-associated infections, or nosocomial infections (Rupp et al., 2007). An estimated 5% of patients develop these infections and consequently cost the United States’ healthcare industry 4.5 billion USD each year (Gould et al., 2009). While the focus of this study is not aimed at measuring the prevalence of nosocomial infections, the hope is that a decline in prevalence will be an eventual outcome of this line of research.

**Purpose Statement**

The purpose of this study is to describe the compliance of hand hygiene procedures in healthcare workers, patients, and visitors, and to determine whether team feedback and the sense of team/community responsibility increases compliance with hand hygiene policy. The study aims to address the following objectives:

1. To determine the baseline compliance of hand hygiene as measured electronically.
2. To investigate if a feedback intervention and a staff advocacy intervention increase hand hygiene compliance by hospital staff, visitors, and patients.

**Review of Literature**

In an attempt to reduce the number of nosocomial infections obtained by patients each year, hospitals promote proper hand-washing techniques as recommended by the Centers for Disease Control and the World Health Organization. Many studies support the hand-hygiene
objectives in hospital settings. Using alcohol-based hand gel (“hand rubbing”) is a validated alternative to hand washing with soap and water (Rupp et al., 2007; Swoboda et al., 2004; Tavolacci et al., 2006). Swoboda et al. (2004) found a correlation between using alcohol-based hand gel and a reduction in healthcare-associated infections by 29% compared to the baseline observation. Rupp et al. (2007) found that the rate of healthcare-associated infections decreased from 1.39 to 0.31 infections per 1,000 days after hand gel was introduced to a hospital unit. Other similar studies have validated these findings as well, supporting that hand hygiene in the form of alcohol-based hand gel is effective at reducing these infections (Boyce, J., Cooper, T., & Dolan, M., 2009; Huggonett, S., Perneger, T., & Pittet, D., 2002).

Researchers have examined how well healthcare team members adhered to hand hygiene after an intervention (Huggonett, S., Perneger, T., & Pittet, D., 2002; Marra et al., 2008; Clarke, M., Randle, J., & Storr, J., 2006; Guzman et al., 2003; Rupp et al., 2007; Sax et al., 2007) and most, with the exception of Sax et al. (2007) found that interventions increase adherence. For example, Rupp et al. (2007) investigated the overall rate of adherence to hand hygiene recommendations on two separate floors and found that adherence was significantly affected by receiving hand-hygiene education and by the availability of alcohol-based hand gel; the adherence rate rose from 38% to 69%. In another similar 3-phase study, Guzman et al. (2003) found that education and performance feedback based off of an initial baseline study greatly improved healthcare workers’ hand hygiene compliance. In a six-month study conducted in England, Clarke, M., Randle, J., & Storr, J. (2006) audited the hand hygiene behavior of health care workers, obtained data from staff and patient surveys, and observed levels of alcohol hand rub, as well as introduced a series of posters and supporting marketing materials, such as aprons and badges, aimed at health care workers and patients alike. The researchers reported an increase
of 74% in hand hygiene compliance through a ‘clean-your-hands’ campaign, coordinated by the National Patient Safety Agency. Similarly, in a cross-sectional study conducted in a 2,200-bed United States teaching hospital, Sax et al. (2007) found that good adherence to hand hygiene policies was likely the direct result of extensive exposure to hand hygiene campaigns. The researchers concluded that “adherence is driven by peer pressure and the perception of high self-efficacy, rather than by reasoning about the impact of hand hygiene on patient safety” (Sax et al., 2007, p 1267). Although numerous studies have been conducted in attempts to understand and improve the low compliance ratings, none have focused on how the “team effort” affects compliance ratings.

Many researchers have examined factors associated with low compliance numbers in order to create more appropriately-aimed strategies for improvement. Tavolacci et al. (2006) hypothesized that a lack of knowledge contributed to the lack of adherence among hand hygiene compliance. The researchers found that physicians seemed to have the highest level of knowledge with regard to the efficacy of alcohol-based hand rub (AHR); however, the nurses and nursing assistants were the ones who were most likely to actually use the AHR. Duggan et al. (2008) found an inverse correlation between the level of professional education and the rate of hand washing compliance. The researcher found that nurses showed significant improvement in rates of hand washing compliance after a JCAHO visit (P= 0.001), but no improvement was seen in attending physicians. Guzman et al. (2003) suggested that reasons for poor compliance, as cited by that institution’s healthcare workers, included “risk of hand irritation, distance to the sinks, and lack of time” (p 86).

Numerous researchers have incorporated the use of electronic AHR devices as a means to measure compliance ratings (Boyce, J., Cooper, T., & Dolan, M., 2009; Huggonett, S., Perneger,
T., & Pittet, D., 2002; Marra et al., 2008). Boyce, J., Cooper, T., & Dolan, M. (2009) state that “monitoring the hand hygiene practices of healthcare workers (HCWs) and providing personnel with feedback regarding their performance are important elements of hand hygiene promotion programs” (p. 1090). Their study collected data over a six-month period to identify a pattern of when the hand hygiene events were occurring. They concluded that using electronic devices with wireless downloading of data from the dispensers may help to monitor hand hygiene trends by providing data on the overall effects of various interventions to improve hand hygiene performance. Three physicians conducted a study in an intensive care unit (ICU) in a 2,300-bed Midwestern hospital to see if using feedback from an alcohol-based hand rub system increased compliance in healthcare workers. They concluded, after obtaining a baseline survey and implementing a hospital-wide campaign, that the overall compliance increased from 38.4% to 54.5% (Huggonett, S., Perneger, T., & Pittet, D., 2002). Their findings, however, were not supported by Marra et al. (2008), whose study included a nurse manager on a step-down unit examining the effect of feedback on hand-washing compliance in healthcare workers. The researchers explained twice a week to healthcare workers the goals and targets for hand washing compliance; data from AHR dispensers that electronically monitored activations were then given to them each week for use as feedback (Marra et al., 2008). Although the feedback intervention did not significantly affect the rate of compliance, this study may be used as a baseline for future studies with regard to interventions to increase hand hygiene compliance.

**Theoretical Framework**

This study is guided by Social Learning Theory (Bandura, 1977). According to Bandura, “most human behavior is learned observationally through modeling. From observing others, one forms an idea of how new behaviors are performed, and on later occasions, this coded
information serves as a guide for action” (Bandura, 1977, p. 13). The theory explains human behavior patterns and proposes that human beings have a tendency to imitate each other, whether consciously or unconsciously, especially in social settings. Learning and behavior result from interactions between the environment and person, who is viewed as an agent exerting control over the learning process.

This theory relates to this project because this study will be conducted on two busy medical-surgical units in a hospital, where healthcare members are closely interacting with each other and have the opportunities to observe each others’ hand hygiene habits and experience the team/community pressure to improve the unit’s hand hygiene compliance rate. The theory suggests that social pressure to comply may boost the hand hygiene activity among healthcare personnel because of the “team reinforcement” that they are “in this together.” Based on this theory, it is anticipated that the feedback and staff advocacy interventions that promote hand hygiene compliance will increase the compliance ratings from baseline due to an awareness of the actions of other co-workers around them.

**Methods**

**Design**

This pilot study used a quasi-experimental design because it functioned like an experiment, with the primary objective being to gather information under a controlled setting, yet it lacked some of the key components of a true experiment, such as a control group and random assignment. Data about hand washing adherence were collected before feedback and staff advocacy interventions to establish a baseline, and after each intervention to determine if the intervention affected adherence.
Setting and Sample

A convenience sample from two medical-surgical units in a 500-bed Midwest hospital was comprised of all team members including healthcare workers (HCWs), visitors, and patients who entered the 24 specified private rooms of the two units during the study period.

Data Collection Procedures

This study examined hand hygiene practices on two similarly-structured medical-surgical units of a Midwest hospital. Although both units contained the same number of hand hygiene product dispensers (found in the same locations on both floors), for the purposes of this study, data were collected only from dispensers measured located in and directly outside of the designated private rooms on both medical floors. There were a total of 24 rooms observed (13 rooms Floor A, 11 rooms on Floor B). Data were collected by two methods: one people-tracking sensor, located in each room, with the ability to track people entering and leaving the room, and two to three electronic hand hygiene devices per room tracking hand hygiene events occurring in accordance with the people-tracking sensor. The frequency of “hand hygiene events” was monitored using an electronic database system that was integrated with the dispensers to provide Real-Time data feedback to the staff. Data from all devices were sent wirelessly to an electronic, password-protected database by a wireless transmitter located on the hospital unit. At any given time period during his or her shift, each staff member was able to view this information in Real-Time on computers located at the nurses’ stations (on both units) for feedback purposes.

During all three phases of the study, data were collected exactly the same way. Data were first collected by the people-tracking sensors located above the entrance-ways of the designated rooms of study; these sensors monitored the motion activity in the rooms and were able to detect when a person had entered the room. For each individual room, this “person counter” number
was then compiled with the actual number of “hand hygiene events” that took place within that
time period. These two numbers were then electronically configured and a “compliance
percentage” was ultimately recorded for each room. An average compliance percentage number
for the entire unit was recorded as well.

Data were collected for 115 days on a 3-phase basis. During Phase I, baseline hand
hygiene practices were measured on both units for a time period of 45 days to ensure the absence
of any significant differences in practice initially. After the baseline period, Phase II was
initiated, which consisted of a “feedback intervention” where data were collected for a time
period of 36 days. In Phase III, a “staff advocacy” intervention was implemented, and data were
again collected for a time period of 34 days.

Interventions

The first intervention was the “feedback” phase and consisted of posting “friendly
reminders” in the form of flyers on all of the doors entering the patient’s rooms and on all of
their bathroom doors as well. The flyers reminded staff, patients, and family members to wash
their hands before entering and upon exiting patients’ rooms. There were also computers on
display at the nurses’ stations on the two floors, providing feedback to the team members.

The second intervention was a “staff advocacy” intervention, which consisted of
mandatory educational meetings for all staff members from both units. During these brief 15-
minute meetings, the staff was informed that they had been being monitored using the Real-Time
data system and an educational component of the rationale behind the study was provided. They
were informed that this was not a “Big Brother” study, meaning they were not going to be
individually watched and critiqued, but rather they were encouraged that this study served as an
empowerment tool for them to improve their compliance ratings. They were encouraged to use
the “team approach” and offer friendly reminders to co-workers throughout the day if they had witnessed non-compliance with the hand hygiene regimens. In addition, they were told that the feedback would be available for them 24/7 in the form of computers on display at the nurses’ station, and they were encouraged to check them over periodically to see how many hand hygiene events had occurred per room so they could gauge how their teams were doing and use this information to determine how the entire floor was doing in comparison to the other unit with respect to hand hygiene compliance.

During this intervention, two floor champions were identified as advocates for each floor to frequently reinforce proper hand hygiene procedure among unit staff members and to encourage advocacy to patients and visitors. In addition, direct observation of the hand hygiene events taking place on both floors was recorded by nurse managers to compare with the electronic measurement system data. The staff advocacy intervention was based on the principle that advocacy is predicated on leadership time and attention. The goal of this intervention was to see an increase in hand hygiene compliance after strong reinforcement of the importance of proper hand hygiene among everyone entering the two units. The theory was that if persons in leadership positions verbalized their support for the study and the cause, healthcare workers, patients, and visitors would recognize the importance as well.

**Measures of Variables**

Hand hygiene compliance was measured \((\text{Hits/Opportunities}) \times 100\). Hits was the number of “one hand swipes” under the alcohol-based hand cleansing dispenser or “one hand swipes” under the soap dispenser in the patient’s bathroom. Opportunities were the number of times persons enter and enter the room.
Results

On each floor, there were 6,250 hand hygiene opportunities per room for every 30 days and 200+ opportunities per room per day. The baseline data showed an average of 10.58% hand hygiene compliance over a 6-week period, which was reported consistently across both floors and all rooms. The average compliance of the one-month feedback intervention (phase II of the study) was 20.41%. The average compliance of the one-month staff advocacy intervention (phase III of the study) was 20.71%. According to hospital statisticians, both increases were statistically different from the baseline data. Individually, Floor A had consistently higher compliance rates than Floor B throughout all three phases of the study. After the baseline phase, Floor A had a mean compliance of 10.72% while Floor B had a mean compliance of 10.41%. After the feedback phase, Floor A more than doubled its compliance with an average rate of 23.10%. Floor B showed improvement as well, but the average compliance rate was lower, at 17.24%. Following the staff advocacy intervention, Floor A showed a mean compliance rating of 23.13%, while Floor B, again, showed a lower mean compliance rating of 17.85%.

Discussion

Compared to the average baseline rate of 10.58%, both floors increased hand hygiene compliance after both the feedback phase and the staff advocacy phase, almost doubling the rates with each intervention, 20.41% and 20.71%, respectively. These increases in compliance rates following the interventions are consistent with the findings of similar studies that show increases of hand hygiene compliance rates of over 50% after one day of an intervention (Bajwa et al., 2009; Clarke, M., Randle, J., & Storr, J., 2006; Hugonnet, S., Perneger, T., & Pittet, D., 2002). However, following the staff advocacy intervention of the study, a gradual decline in hand hygiene compliance was seen once the feedback was removed. Removing feedback (monitor
displays and nurse manager follow-ups) resulted in a reversion of back to about 12% after a month following the study’s end. This eventual decrease is similar to the findings of others (Huggonett, S., Perneger, T., & Pittet, D., 2002; Tavolacci et al., 2006). These studies may increase understanding about the root problems associated with hand hygiene compliance and why, over time, the compliance rates tend to revert to baseline. For example, Huggonett, S., Perneger, T., & Pittet, D. (2002) found that inconveniently located dispensers and the limited availability of them may contribute to lower compliance ratings. Tavolacci et al. (2006) found that HCWs were reluctant to use alcohol-based hand rub because they felt that the solution irritated their skin.

A possible reason for the spike in compliance rates during both the feedback and the intervention phases may be related less to staff concern about patient vulnerability to a nosocomial infection, and more to staff fear of retribution for actions of non-compliance with hospital policy. This may explain why, after removal of feedback on both floors, the numbers reverted back closer to baseline. Based on this reasoning, it can be deducted that individuals may only engage in “socially acceptable” behavior when they feel like there may be a consequence.

In this particular study, it is also possible that compliance rates were affected by flaws in the technology used to collect data. For example, compliance rates and calculations were affected if staff, family, or visitors randomly used the dispensers outside of patient rooms when passing by and not necessarily before entering one of the private rooms to care for that patient. This was referred to as “noise” and was presumed to be equal between units. Compliance rates and calculations were also affected when nurses and physicians did not use hand hygiene when doing “hourly rounds” and only observing patients.
The observational reports of the staff champions during the staff advocacy intervention varied significantly from electronically collected data. Champion-observed data during this time period showed the compliance of approximately 70%, compared to system-measured data, which showed about 20% compliance. This suggests that HCWs, patients and visitors were more likely to practice hand hygiene if they thought they were being observed.

Although the baseline data from both floors showed equivalent compliance rates (10.72% vs. 10.41%), Floor A had higher compliance rates (approximately 6 percentage points) than Floor B during both the feedback phase and the staff advocacy phase. It is unknown why this difference occurred. One possible reason might be that a better sense of communication and the “team approach” occurred on Floor A, although this was not examined.

One major focus of this study was the “team approach,” which the second intervention emphasized. The theory behind the “team approach” was that by addressing each individual unit as a whole and including the patients and visitors to be a proactive part in patient care, there would be an increase in the hand hygiene compliance because people would look to others to set an example of proper hand hygiene technique, and then follow suit. What was observed, however, was that nurses are seldom willing to reach out and remind another team member, especially a doctor, of the proper hand hygiene technique. When surveyed, nurses reported that they did not feel it was their job to inform nurses or other professionals to use proper technique; they felt as though it was an “every man for himself” type of responsibility and it was not part of their individual responsibilities to remind other team members to wash their hands when necessary. This finding speaks to an entirely different view of nursing from a “team approach” to a more individualistic approach.
The initial findings support Bandura’s Social Learning Theory, which proposes that human beings have a tendency to imitate each other, whether consciously or unconsciously, especially in social settings (Bandura, 1977). During the staff advocacy phase, the floor champions served as role models for hand hygiene compliance. They stated that they believed that healthcare workers felt like they were being watched and may have felt the pressure to comply with hand hygiene policy under leader supervision. This may explain slightly higher compliance rates during the staff advocacy phase as compared to the feedback phase. The reversion back to about 12% compliance following a month of the study’s end suggests that there was no long-lasting behavioral impact on the floors. Temporary increase in compliance may have stemmed from the staff and patient perspective that this was a “temporary study”

Conclusions

The compliance with hospital hand hygiene policy, or lack thereof, may always be a topic of concern among health care workers because of the established correlation between the frequency of hand hygiene events and the rates of nosocomial infections within hospital settings. This study examined the effects of two interventions on hand hygiene compliance and showed that there was an increase on both units after two separate interventions, but that the compliance reverted toward baseline following the study’s end. Results from this study may serve as a foundation for additional interventions to improve hand hygiene practices at this specific hospital, and for other hospitals as well. In addition, this study can serve as a guideline for future studies to introduce the concept of “team” feedback in regards to hand hygiene practices using automated dispenser monitoring.
Limitations

As with any study, the findings are limited due to the one-hospital setting. The study was conducted on two units of a 500-bed hospital and may not have been representative of the hand hygiene practices of the hospital as a whole or to hospitals in general. Another limitation that was mentioned earlier was that people on both of the floors may have randomly used the dispensers outside of a patient’s room, introducing data collection error. Indeed, the floor champions did observe these events happening equally on both units.

Another limitation noticed by the floor champions during the staff advocacy intervention was the observance of the Hawthorne Effect among HCWs. It is a common trend observed among human beings for one to presumably behave the way one is expected to behave when feeling watched or judged by another, especially a figure of authority. This phenomenon suggests that healthcare workers and visitors may be more inclined to comply with hospital hand hygiene policy if they feel are being watched, rather than because they feel like they are part of a “team effort.”

Implications for Practice

In hospitals nationwide, two of the major goals are to reduce the number of nosocomial infections and to improve the quality of care towards patients. The findings of this study suggest that interventions to promote hand hygiene compliance should be frequent, consistent, and include real-time feedback. The fact that this study shows a low rate of baseline compliance, a spike after incentive-driven interventions, and a decline back to baseline following the study’s end, suggests that problems associated with hand hygiene compliance may be more complicated and multidimensional than previously thought. The knowledge that lack of proper hand hygiene can lead to nosocomial infections should be incentive enough for HCWs to consciously make an effort to wash their hands, but perhaps a reminder in the form of hand hygiene compliance
research evidence might give them additional incentive to seek an improvement in patient care through diligent hand hygiene practice.

**Recommendations for Future Studies.**

For future studies, researchers should examine the meaning behind the hand hygiene compliance percentages. For example, perhaps discussing with unit staff what lower numbers mean in terms of nosocomial infections might give healthcare workers more of an incentive to wash their hands. A qualitative approach might also increase understanding about additional factors influencing compliance.

Researchers should also examine the relationship between cultures of safety and community versus individualism within nursing and hand hygiene compliance. This study used the “team approach” to help boost the compliance ratings. It was emphasized to the nurses that it is ultimately their job, as the patient’s advocate, to promote the most optimal safety environment for their patients. Examining culture within nursing may increased understanding about nurses’ beliefs in their ability to affect hand hygiene compliance.

Lastly, building off of the findings of this study, researchers should also examine the prevalence of nosocomial infections along with examining the effect of similar interventions on hand hygiene compliance ratings. After all, the number one long-term goal of this study, or for any study of this nature, is patient outcome and patient safety.
References


