Monitoring Hand Hygiene Adherence Through the Perception of the Hawthorne Effect: An Observational Study in Hospital Settings

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Abstract

Standardized hand hygiene protocols are crucial in reducing the incidence of hospital-acquired infections. However, compliance rates among healthcare workers remain suboptimal, necessitating strategies to improve adherence. The Hawthorne effect, wherein individuals modify their behavior due to awareness of being observed, presents challenges in accurately monitoring hand hygiene practices. The quality improvement project described in this study aimed to increase hand hygiene adherence by leveraging the Hawthorne effect, by increasing staff awareness of being observed over two months. Three of seven hospital units participated, and hand hygiene compliance was assessed using direct observations and indirect estimates by product usage. The two measures demonstrated contrary trends over time in compliance rates. Estimations by product usage showed a 20% increase in compliance at the end of the two months, while direct observations did not show any significant change. With these preliminary findings, we cannot yet conclude that this quality improvement project led to increased hand hygiene adherence.

Introduction

Standardized hand hygiene protocols are essential in healthcare settings to mitigate the risk of healthcare-associated infections (1). Despite routine infection control training, healthcare workers exhibit suboptimal compliance rates, with some institutions finding hand sanitization occurring in only approximately half of the appropriate instances (1). The most commonly used method of measurement of hand hygiene compliance rates is direct observation, in which human auditors monitor the hand hygiene compliance of healthcare workers as they go about their regular duties. This method of measurement is often complicated by different biases, including the Hawthorne effect. The Hawthorne effect refers to the tendency of individuals to modify their behavior due to the awareness of being observed.

Since human observation influences its subjects, electronic tracking of hand hygiene product use has also been introduced. This may seem like a superior measuring system at first glance. However, unlike human observers, automated counts are not easily adaptable in evolving clinical contexts. For example, tracking product use without concomitantly tracking room entries does not account for bundled care, which minimizes the number of entries into a patient room by combining multiple tasks in one patient encounter. While human observers understand that this decreases the number of handwashing opportunities, tracking product use alone would yield an artificially low estimate of compliance.

It has been shown that the Hawthorne effect transiently increases hand hygiene compliance rates, as healthcare workers tend to follow hand hygiene protocols more closely if they believe they are being monitored (2). Understanding this trend, some healthcare systems have utilized the Hawthorne effect to their advantage by strategically deploying trained auditors to improve compliance rates (3). In the quality improvement project described in this study, we sought to leverage the Hawthorne effect to improve hand hygiene adherence at the Geisinger Lewistown Hospital (GLH) by announcing increased monitoring of staff hand hygiene practices on participating units during the two-month study period. We describe the first cycle of this new quality improvement project. This project may be repeated or revised by subsequent student cohorts.

Methods

Three units at Geisinger Lewistown Hospital (GLH) were selected for implementation: Med Surg (Unit 3B), Telemetry (Unit 4B), and Onco Med Surg (Unit 5A). Posters announcing a "new hand hygiene initiative" were placed in staff-only areas, accompanied by printed reminders about best practices. The posters implied that GLH would monitor hand hygiene practices more closely for the months of December 2022 and January 2023. This message was reinforced during morning huddles every day on participating units. Only nurse leaders and a small number of support staff were privy to the project design.

Two measures of hand hygiene compliance were collected, yielding separate data sets over the study period. The first measure was direct human observation, reported by select staff members. No new personnel were recruited for this study because the hospital was already monitoring hand hygiene this way. Staff observers were required to record a minimum of 20 observations per month of hand hygiene opportunities for their assigned units; if this was not met, the data was excluded. Designated staff observers were instructed to record every hand hygiene opportunity that occurred in their field of vision in 5- or 10-minute sessions to minimize selection bias when recording observations. Due to staff scheduling, this data was primarily collected during the day shift on weekdays.

The second measure was a series of indirect estimates based on automated refill counts of hand sanitizer dispensers, or “product counts.” One refill of an electronic dispenser corresponded to approximately 200 dispenses; therefore, dispenses were counted in increments of 200. The hospital had pre-calculated

	Unit		
Month	3B	4B	5A
November	84%	30%	90%
December	92%	100%	100%
January	73%	69%	85%
February	82%	61%	89%

Table 1. Compliance rates reported by staff observers on their respective units for the months of November 2022 through February 2023.

Month	Unit	Patient Days	Hand Sanitizer Dispenses	Expected Hand Sanitizer Dispenses	Estimated Compliance
October	3B	595	32,400	56,525	57%
	4B	638	21,600	60,610	36%
	(Excluded from analysis due to incompleteness)				
November	3B	498	26,400	47,310	56%
	4B	587	16,800	55,765	30%
	5A	528	21,600	50,160	43%
	Pooled	1613	64,800	153,235	42%
December	3B	552	28,800	52,440	55%
	4B	667	9,600	63,365	15%
	5A	625	27,600	59,375	46%
	Pooled	1844	66,000	175,180	38%
January	3B	549	33,600	52,155	64%
	4B	642	28,800	60,990	47%
	5A	586	43,200	55,670	78%
	Pooled	1777	105,600	168,815	63%

Table 2. Estimated compliance by unit by month based on patient-days, approximate number of hand sanitizer dispenses, and expected number of hand sanitizer dispenses. Pooled monthly totals are included as used in the subsequent statistical analysis.

estimates of how many dispenser refills would be needed on each unit to meet 100% compliance, adjusted for patient-days and tailored to individual units (Table 1). Using these calculations, compliance was estimated by comparing actual product counts against expected product counts. Because this was an indirect measure, we reasoned that analyzing change over time would yield more useful information than the absolute values of individual estimates. We also predicted that since this measure would theoretically not be influenced by the Hawthorne effect, the product count-derived estimates would be lower than observer-reported compliance rates.

Data was exported for all hospital units, including non-participating units (6B, OB, ICU, and ED) and was compiled to span the announced observation period and at least one month prior. Compliance rates on participating units were plotted by month and trends over time were compared between the two measures. For statistical analysis, data from participating units was pooled for maximum sample size. The two-sample z-test was used to calculate a 95% confidence interval (CI) for changes in compliance between the months prior to the announcements and the end of the study period.

Results

Data that were available for export and analysis are shown in Tables 1 and 2. The number of direct human observations

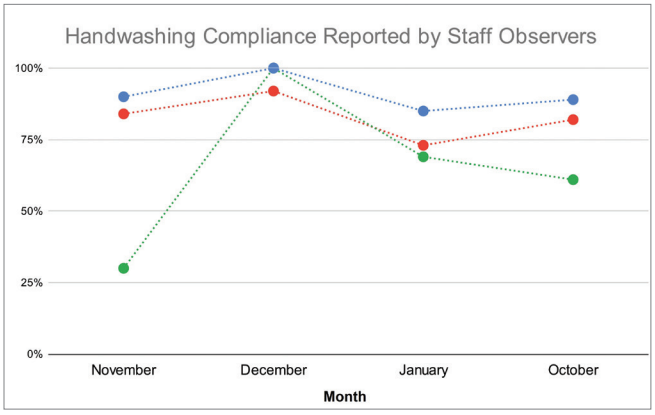

Figure 1. Handwashing compliance reported by staff observers on the three units where increased observation was announced. There was no significant change in compliance rates combined across units. Red – 3B, green – 4B, blue – 5A.

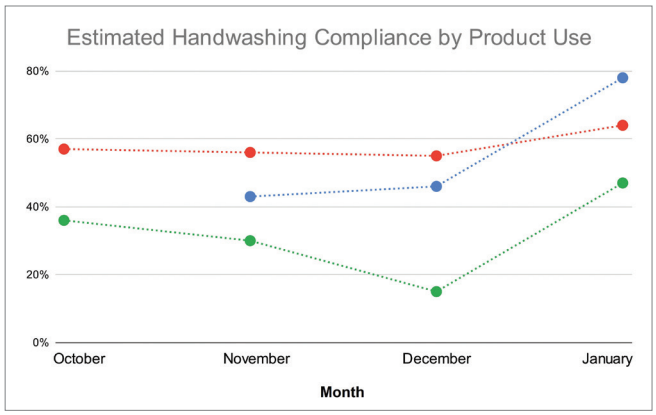

Figure 2. Estimated handwashing compliance on the three participating units, calculated by product count (i.e., hand sanitizer dispenser refills) from October 2022 to January 2023. Estimated compliance, combined across units, was 20% higher in January than in November. Red – 3B, green – 4B, blue – 5A.

submitted by staff each month was not included in the data exports, so monthly observations could not be pooled across units. For statistical testing, they were combined into unweighted averages with a conservative assumption of 20 observations per data point.

The two measures of hand hygiene compliance, direct observations vs. product counts, exhibited divergent compliance rates in both absolute values and trends over time (Figures 1 and 2). Staff-observed compliance reached a maximum of 100% while product count estimates never surpassed 80%. In December 2022, overall compliance peaked in observer reports but reached its lowest point according to product counts.

Analyzing product counts alone revealed a statistically significant increase of approximately 20% (95% CI: 9.6% – 31%) in combined handwashing rates for the three units from November 2022 to January 2023. Notably, product counts from all hospital units showed an increase in the same time period: combined product counts from the non-participating units increased from 68% to 84% (95% CI: 4.9% – 27%). Data from October 2022 were incomplete and not used for analysis.

There was no significant change in hand hygiene compliance reported by staff observers from November to January.

Discussion

In this study, the inconsistencies between direct observations and product count data once again highlight the challenges of measuring compliance accurately. The Hawthorne effect was known to be a likely culprit in elevating staff-observed compliance rates compared to the automated product counts. Other human biases may have also contributed to differences between the data sets, such as subjective pressures on staff observers to make their home units appear more adherent. The statistically significant increase in handwashing based on product counts is consistent with our hypothesis that announcing increased monitoring could influence hand hygiene practices in the hospital; However, we hesitate to attribute this increase to the announcements and posters because of the vast inconsistencies between the two measures of compliance used.

There are at least three potential explanations for the significant increase found in the product count data. First, the morning huddles, where staff were verbally reminded about the handwashing initiative, involved staff members who worked on multiple units. This may have spread the awareness of "being watched" to non-participating hospital units. Second, confounders such as floor-specific hand hygiene initiatives and seasonal patterns may have boosted compliance during the study period. Finally, the refill-counting system itself was new, going live the same month that this project began collecting data. While no specific problems were noted, it is possible that the product counts were less reliable in the first few months of rollout. Having baseline data across longer time periods, ideally years, would give better context to these preliminary findings. Our hope is that this quality improvement project will be continued by subsequent student cohorts. This first cycle will serve as a baseline for further study.

Another potential contributor to differences between observer-reported compliance and the estimates by product count is the practice of bundled care, as mentioned previously. It would be helpful to investigate whether bundled care is practiced more often during certain times of year, such as around holidays when staffing is lighter. These seasonal patterns would influence the hand hygiene compliance estimates from the product count system.

Extensions of this preliminary study may include anonymous interviews with staff observers to explore observer bias. A qualitative study of staff members' attitudes and beliefs about their hand hygiene habits would also be worthwhile. Insight into these areas will allow hospitals to target more specific human thoughts and behaviors to improve hand hygiene practices.

Conclusion

In this quality improvement project, we aimed to leverage the Hawthorne effect to increase hand hygiene adherence by announcing increased monitoring of staff behavior in three hospital units. The direct and indirect measures of compliance used in this study demonstrated contrary trends in compliance rates. Staff compliance based on direct observations did not significantly change from the beginning to the end of the study period. While the product count analysis indicated a statistically significant increase in adjusted hand sanitizer use, we hesitate to attribute the improvement to the project announcements. Further iterations of this study design are needed to support this assertion.

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Disclosures

We have no financial conflicts of interest to disclose.

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