

Improving hand hygiene compliance

Dr. Dipti Gaikwad¹, Pooja Dengale²

¹(Infection control officer, Infection control department, Vishwaraj Hospital, Pune, India)

²(Infection control nurse, Infection control department, Vishwaraj Hospital, Pune, India)

Abstract:

Background: Proper hand hygiene is the single most important, simplest, and least expensive means of reducing the prevalence of Health care associated infections and the spread of antimicrobial resistance. The purpose of this project was to observe compliance of hand hygiene, study factors causing noncompliance and improvement following intervention

Materials and Methods: This was a prospective Hand Hygiene Project. It was a 6 month Quality improvement project (June 2018 to November 2018) designed to improve hand hygiene compliance at Vishwaraj hospital. Data on hand hygiene compliance were collected monthly from June 2018 to November 2018

Results: At baseline, hand hygiene compliance averaged 41.6% in our hospital. Data revealed nine different causes of hand hygiene noncompliance; we developed and implemented specific interventions targeted to causes of hand hygiene noncompliance. The improvements were associated with a increase in compliance from 41.6 % to 54.2 % ($p < 0.05$), a level of performance that was sustained for 4 months through the end of the project period.

Conclusion: We targeted the most important causes of hand hygiene failure. Such a targeted approach is an effective improvement strategy.

Key Word: Handhygiene, Hand hygiene barriers, QualityProject

Date of Submission: 10-11-2020

Date of acceptance: 25-11-2020

I. Introduction

In the 1840s, Semmelweis demonstrated the efficacy of hand hygiene in dramatically reducing maternal deaths in hospitals from puerperal fever.^[1] Ever since, the goal of achieving and sustaining high rates of compliance with hand hygiene protocols has generally eluded hospitals. For example, in a systematic review of 96 studies from around the world, Erasmus et al. reported a median hand hygiene compliance rate of 40% in hospital units of all kinds.^[2] In 2005 the World Health Organization announced the launch of its first Global Patient Safety Challenge, which was focused on improving hand hygiene.^[3]

In this project, we describe the most important specific causes of hand hygiene noncompliance at their respective settings and subsequent targeting of specific interventions to remedy them.

II. Material and Methods

This prospective Hand Hygiene Project was a 6 month Quality improvement project (June 2018 to November 2018) designed to improve hand hygiene compliance at Vishwaraj hospital. Data on hand hygiene compliance were collected monthly from June 2018 to November 2018. Because this project involved increasing compliance with already existing hospital policies and because all staff was expected to comply, Institutional Review Board approval was not required.

Project Planning and Implementation

The project followed the general outline of a typical, five-step Six Sigma project (Define, Measure, Analyze, Improve, Control)— Define the problem precisely, Measure its magnitude reliably, Analyze the causes of hand hygiene failure, Implement interventions targeted to specific causes, and Control (sustain) the improvements over time.^[4] The teams paid close attention to change management throughout the project. Specific tools were used to engage all relevant stakeholders in the project, identify particular sources of resistance to change to facilitate overcoming them, maintain support for the interventions, and hand over oversight of the improvements to frontline staff to facilitate their sustainability

Defining and Measuring Hand Hygiene:

- Hand hygiene was defined as washing (or cleaning) hands with an alcohol- based foam or gel or soap upon entry and exit of a patient care area or environment.

Data collection—

Determining how data was collected was critical to the project. We realized if people know they are being monitored, they will adjust their behavior accordingly. Our team decided it was important to have secret observers collecting baseline data.

In this project, information was gathered by using:

- a) Hand hygiene observers
- b) Just- in- time coaches.

Rather than just collecting compliance information, the hand hygiene observers collected data on the observed factors that can lead to hand hygiene non- compliance such as health care personnel entering a room with their hands full of supplies. The just- in- time coaches began data collection two weeks after the observers have begun collecting compliance data, since this effort can be considered a form of intervention. Coaches approached the health care worker when a non- compliant event occurred to gather non- observed factors of hand hygiene failures such as the perception of the health care workers that hand hygiene was not required.

Just- in- time coaching data was kept separate from the compliance data since staff members can become familiar with people in a coaching role, which could skew the data. The observed and non- observed factors information is what provides the information needed to generate targeted solutions. Just- in- time coaches included in charge nurses, shift in charges, supervisors, Head of department etc.

Just- in- time coaching helped in capture of the root causes of failure to wash hands. If personnel failed to wash their hands, coaches asked why and help identify observed contributing factors. Just- in- time data was kept separate from baseline observational data. Staff members can become familiar with people in a coaching role, which could skew the data.

Data was collected on hand hygiene audit forms which monitors five moments of hand hygiene.^[5] It was collected twice every month for the first two months (May 2018 to June 2018) and later every week. Simultaneously causes for noncompliance were noted down by the observers and just in time coaches. Hand hygiene was observed in all ICUs and General wards throughout the Hospital

Analysis of Data

An average percentage of hand hygiene compliance was calculated each month. The mean percentage of data from June 2018 and July 2018 was compared to the mean data of the next two months (Post intervention phase I /Improve phase (Aug 2018 and Sep 2018) which was post the hand hygiene improvement interventions. The mean percentage of data from June 2018 to July 2018 was also compared to the mean data of the two months (Post intervention phase II /Control phase: Oct 2018 and Nov 2018) post hand hygiene improvement interventions with no just in time coaching. Causes of non-compliances were noted down and necessary actions taken. The study hypothesis is that the major improvement would occur in the Improve phase (and that this improvement would be sustained in the Control phase. The hand compliance percentage were compared by using Chi-square and $p \leq 0.05$ was considered statistically significant

III. Result

Hand hygiene Compliance and causes of noncompliance were studied during the period of June 2018 to Nov 2018 in general wards and intensive care units of Vishwaraj Hospital; 5 moments of hand hygiene were monitored.

Identifying Causes of Hand Hygiene Noncompliance

The data collected revealed nine main causes of hand hygiene noncompliance which are enumerated in Table 1. It was realized that almost all the specific causes of hand hygiene failure would require separate and distinct interventions to remediate. For example, inconvenient location of hand rub dispensers required purchasing and placing dispensers in close proximity to the entrance to patient rooms. Ensuring that dispensers are always full required the development and implementation of an effective maintenance program. Specific gaps in the knowledge and training of particular disciplines of caregivers, such as housekeepers or food service workers, required the modification of the hospitals' education and training programs for them. Changing the culture of a hospital unit so that all staff at every level of seniority and job type would feel not only comfortable but obligated to stop another individual from entering a patient room without washing hands required a solution entirely different from all the others.

Table 1 .Causes of Hand Hygiene Noncompliance
Ineffective or insufficient education Lack of uninterrupted supply of hand rub, soap and paper towels Inappropriate placement of dispensers or sinks Hand hygiene compliance data not collected/reported accurately or frequently Lack of accountability & just-in-time coaching Safety culture does not stress hand hygiene at all levels Wearing gloves interferes with process Perception that hand hygiene is not needed if wearing gloves Health care workers forget

Deployment of interventions

Causes of hand hygiene noncompliance were noted down by the observers and just in time coaches, were discussed and necessary solutions / interventions planned and implemented. The specific interventions are tabulated in Table 2

Table 2. Interventions for specific causes of hand hygiene	
Ineffective or insufficient education	<ul style="list-style-type: none"> • Training given multiple times • Daily bed side training given by ICN • Training Include information on infection prevention, and stress the organization wide commitment to hand hygiene, highlighting strategies deployed to reinforce compliance, such as posters • Training given at Induction • Reinforced education with just-in-time coaching.
Lack of uninterrupted supply of hand rub, soap and paper towels	<ul style="list-style-type: none"> • Pharmacy and stores to provide uninterrupted supply of hand rub, soap and paper towels • Nursing in charges to put indent for supplies well in advance
Inappropriate placement of dispensers or sinks	<ul style="list-style-type: none"> • Dispensers placed at entry ,bed side, and on dressing trolley • Sinks placed at accessible and convenient locations
Hand hygiene compliance data not collected/reported accurately or frequently	<ul style="list-style-type: none"> • Hand hygiene data collected more frequently i.e. every week for all units • Data collection done by staff aware of appropriate collection methods
Lack of accountability & just-in-time coaching	<ul style="list-style-type: none"> • Leaders worked as just-in-time coaches to reinforce compliance. • Just-in-time coaches, intervene to remind health care workers to wash their hands. • Applied progressive disciplinary action against repeat offenders.
Safety culture does not stress hand hygiene at all levels	<ul style="list-style-type: none"> • Make hand hygiene a habit by repeat training And reminders • Hold everyone accountable and responsible—physicians, nurses, food service staff, housekeepers, technicians, therapists.
Wearing gloves interferes with process	<ul style="list-style-type: none"> • Made it a process to wash hands, gown and then put on gloves through repeat training
Perception that hand hygiene is not needed if wearing gloves	<ul style="list-style-type: none"> • Training and education highlighting importance of hand hygiene with appropriate glove usage
Health care workers forget	<ul style="list-style-type: none"> • Health care workers to signal to a peer that they missed an opportunity and need to wash. • Announcement made every 2 hourly to remind for hand hygiene • Appreciation of staff for good hand hygiene practices • Application of disciplinary action against repeat offenders.

Hand hygiene compliance data

Hand hygiene compliance data was collected for a period of six months from June 2018 to Nov. 2018 (Table3). Five moments of hand hygiene were monitored and marked as action taken and missed opportunities. An increase in hand hygiene compliance is seen in improve phase starting from August 2018 and sustained during control phase. (Chi square=19.4; probability=0.002) as shown in Table 3 and Fig. 1

Table 3:Percentage Compliance of hand hygiene from June 2018 to Nov 2018						
Month	Jun-18	Jul-18	Aug-18	Sep-18	Oct-18	Nov-18
Actions taken*	34	53	104	70	85	88
Missed opportunities	54	68	102	45	60	59
Total opportunities	88	121	206	115	145	147
Compliance %**	38.6	43.8	50.4	60.8	58.5	59.8

*Actions taken:Hand wash / Alcohol Hand Rub, ** Compliance %: Actions / opportunities * 100

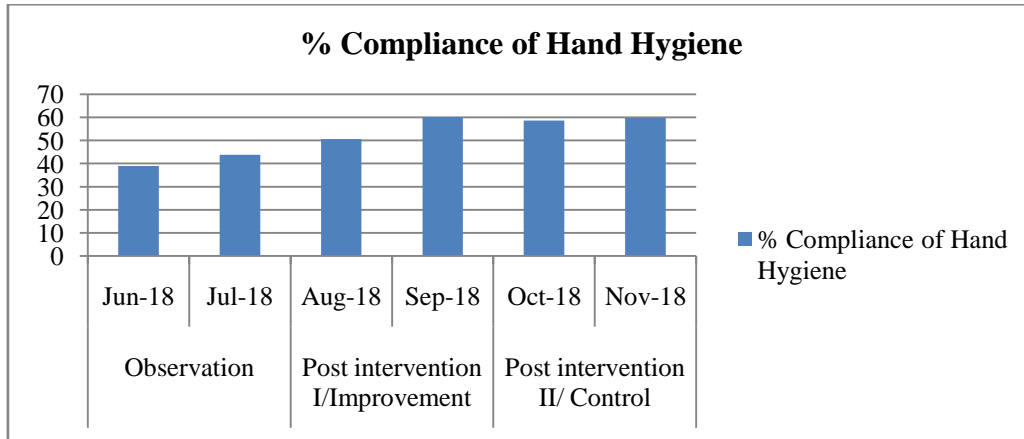


Figure 1: Percentage Compliance of hand hygiene from June 2018 to Nov 2018

We compared baseline (pre intervention) compliance data for 2 months (June 18 and July 18) to post intervention data from Aug 2018 to Sep 2018 (Improve phase) and control phase of post intervention from Oct 2018 to Nov 2018. (Table 4 and Fig. 2)

Table 4: Compliance of hand hygiene pre and post interventions

	Post intervention			
Phase	Observation	Improvement	Control	
Month	June 18 -July 18	Aug 18-Sep 18	Oct 18-Nov 18	Total
Actions taken*	87	174	173	434
Missed opportunities	122	147	119	388
Total opportunities	209	321	292	822
Compliance %**	41.6	54.2	59.2	

*Actions taken:Hand wash / Alcohol Hand Rub, ** Compliance %: Actions / opportunities * 100

Chi square=15.6; probability=0.000

Analysis of proportion comparison over three phases (Table 4) was statistically significant

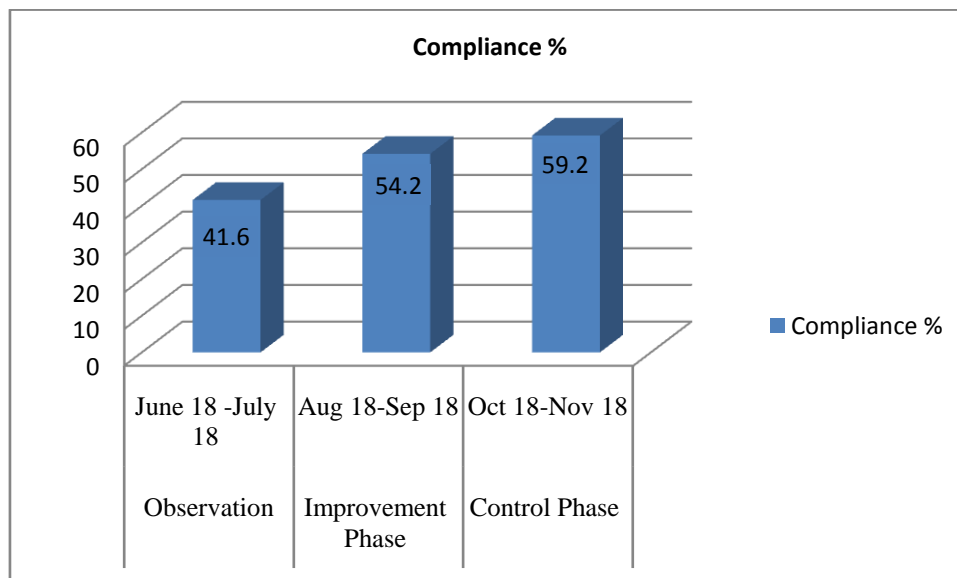


Figure 2: Percentage Compliance of hand hygiene pre and post interventions

Hand hygiene compliance during observation phase when compared with the improvement phase that is after specific interventions was found to be statistically very significant ($p=0.005$) as seen in Table 5. The improvement in hand hygiene compliance was sustained during the control phase ($p=0.000$) as seen in Table 6.

Table 5: Comparison of hand hygiene compliance % during observation and improvement phase

Phase	Observation	Improvement	
Month	June 18 -July 18	Aug 18-Sep 18	Total
Actions taken*	87	174	261
Missed opportunities	122	147	269
Total opportunities	209	321	530
Compliance %**	41.6	54.2	

*Actions taken:Hand wash / Alcohol Hand Rub, ** Compliance %: Actions / opportunities * 100
Chi-square=8.01; probability=0.005

Table 6: Comparison of hand hygiene compliance % during observation and Control phase

Phase	Observation	Control	
Month	June 18 -July 18	Oct 18-Nov 18	Total
Actions taken*	87	173	260
Missed opportunities	122	119	241
Total opportunities	209	292	501
Compliance %**	41.6	59.2	

*Actions taken:Hand wash / Alcohol Hand Rub, ** Compliance %: Actions / opportunities * 100
Chi-square=15.1; probability=0.000

The percentage compliance from improvement phase when compared to control phase was not found to be statistically significant (p=0.208) which indicates that the improvement in compliance was sustained in the control phase (Table 7)

Table 7: Comparison of hand hygiene compliance % during Improvement and Control phase

Phase	Improvement	Control	
Month	Aug 18-Sep 18	Oct 18-Nov 18	Total
Actions taken*	174	173	347
Missed opportunities	147	119	266
Total opportunities	321	292	613
Compliance %**	54.2	59.2	

*Actions taken:Hand wash / Alcohol Hand Rub,** Compliance %: Actions / opportunities * 100
Chi-square=1.58; probability=0.208

IV. Discussion

Using varied methods and definitions, studies repeatedly show that improving hand hygiene compliance in hospitals reduces rates of infection.^[6, 7, 8] However, efforts to improve rates of hand hygiene compliance have proved difficult to spread and sustain.^[9, 10] A number of factors have been identified as barriers to such efforts.^[11, 12]

We employed Lean, Six Sigma, and change management tools to systematically assess causes of hand hygiene noncompliance and to drive improvement in our hospital. The hand hygiene compliance improved and sustained the improved levels for 4 months. Our findings suggest that several factors were associated with this success and may be important considerations in the design and implementation of such programs. Each one of these different causes of hand hygiene noncompliance pointed toward very different remedial measures. Each intervention targeted to one of the most important causes of hand hygiene failure in the facility.

This study has a few limitations. Only In patients wardstaff were studied, we did not monitor outpatient staff. Also the staff was not the same every time we did the audit. Because the evaluation design compared baseline with post intervention rates of compliance, we cannot be certain that the interventions developed by project participants were solely responsible for the improvements in hand hygiene compliance. For example, we cannot exclude the possibility that influences external to this project, such as other programs or activities to reduce the frequency of health care-associated infections, played a role in influencing rates of hand hygiene compliance. Nor can we assess which of the specific interventions had the greatest effect on improving hand

hygiene because multiple interventions were deployed at the same time during the Improve phase. Finally, although we have documented substantial improvements in hand hygiene compliance, we have not evaluated that health care-associated infection outcomes concomitantly improved for these hospitals.

V. Conclusion

At baseline, hand hygiene compliance averaged 41.6% in our hospital. Data revealed nine different causes of hand hygiene noncompliance; we developed and implemented specific interventions targeted to causes of hand hygiene noncompliance. The improvements were associated with a increase in compliance from 41.6 % to 54.2 % ($p < 0.05$), a level of performance that was sustained for 4 months through the end of the project period.

In this project we used Lean, Six Sigma, and change management tools to improve their hand hygiene compliance from 41.6 % to 54.2% and sustained that high level of improved performance for 4 months. We targeted the most important causes of hand hygiene failure. Such a targeted approach is an effective and efficient improvement strategy.

Acknowledgement

We would like to specially thank the patients, Nursing Department, Infection Control Department, Doctors and all other staff for their co-operation and inputs in successful completion of this Project. A special thanks to Dr. Ashwini Kshirsagar for helping with the statistics of the project.

References

- [1]. D.Pittet, J.Boyce, Hand hygiene and patient care: Pursuing the Semmelweis legacy, *The Lancet Infectious Diseases*, 1(0),2001,9–20.
- [2]. V.Erasmus, T.Daha, H. Burg, et al, Systematic review of studies on compliance with hand hygiene guidelines in hospital care, *Infection control Hospital Epidemiology*,31(3),2010,283-294.
- [3]. World alliance for patient safety,Global patient safety challenge,2005-2006,Clean care is safer care,Accessed May 2018. https://www.who.int/patientsafety/events/05/GPSC_Launch_ENGLISH_FINAL.pdf
- [4]. M. Chassin, C. Mayer,K Nether, Improving Hand Hygiene at Eight Hospitals in the United States by Targeting Specific Causes of Noncompliance, *The Joint Commission Journal on Quality and Patient Safety*,41(1),2105,4-12.
- [5]. Hand hygiene –observation tool, WHO, Accessed Feb 2108, <https://www.who.int/teams/integrated-health-services/infection-prevention-control/hand-hygiene/tools-and-resources>.
- [6]. P.Mathur, Back to the basics of infection control, *Indian Journal of Medical Research*, 134(5),2011,611-620
- [7]. I.Daniels, B.Rees, Handwashing :Simple but effective, *Annals The Royal college of surgeons of England*,81,1991,117-118
- [8]. V. Rosenthal, S.Guzman, N.Sufdar, Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina, *American Journal of Infection Control*, 33(7),2005,392-397
- [9]. E.Larson, K.Kretzer, Compliance of Hand washing and barrier precautions, *Journal of Hospital infection*, 30, 1995,88-106
- [10]. A. Huis, T. Achterberg, M.Bruin et al, A Systematic review of hand hygiene improvement strategies: a behavioural approach, *Implementatuion science*,7(92),2012, 1-14
- [11]. D.Pittet, P.Mourgouga, T.Perneger, Compliance with hand washing in a teaching hospital, Infection Control Program, *Annals of Internal Medicine*,130(2),1999,126-130
- [12]. L.Sproat, T. Inglis, A multicentric survey of hand hygiene practice in intensive care events, *Journal of Hospital Infection*, 26(2),1994,137-148

Dr. Dipti Gaikwad1, et. al. “Improving hand hygiene compliance.” *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 9(6), 2020, pp. 01-06.