

To Increase the Practice of Hand Washing with the Correct 7-Step Technique for 2 Minutes for Doctors Conducting Vaginal Deliveries from Baseline to 80 % in 4 Weeks

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ARTICLE INFO	ABSTRACT
<p>Article type: Original Article</p> <hr/> <p>Article History: Received: Accepted:</p> <hr/> <p>Key words: Hand Disinfection, Hand Hygiene, infections, Quality Improvement, Plan-do-study-act</p>	<p>Introduction: Hand washing is one of the basic habits to prevent infection from service provider to service seeker. Germs are transmissible from one person to another. Hand washing is an effective measure to prevent infection in a health care setting. Local problem: In the labour room, it was found that doctors who are conducting deliveries are not doing hand washing with the correct steps for 2 minutes as often as they should.</p> <p>Materials and Methods: A quality improvement team was formed. Fishbone analysis was performed to determine handwashing status, and five plan-do-study-act (PDSA) cycles were completed to implement a change intervention, with one change being tested, implemented, studied, and adapted for the next PDSA cycle in each cycle. Interventions: Hand washing resources were made available to students, awareness messages were distributed, and live demonstrations and interactive hand washing instruction were conducted in the labour room.</p> <p>Results: Baseline data showed that 10% of doctors were hand washing; a change intervention was implemented after the first PDSA data rose to 55.5%; further PDSAs 2, 3, and 4 were completed, and handwashing rates improved to 69.1%, 66.1%, 75%, and 80%, respectively.</p> <p>Conclusion: It is very important to identify system dysfunction. Acceptance of the problem is half the solution, and by applying simple methods of quality improvement by an enthusiastic team and continuing motivation to make the desired change happen here, we could change the habits of junior residents.</p>
<p>► Please cite this paper as: Gautam S, Malik N, Chauhan M, Malhotra V, Singhal SR, Malik R, Nanda S. To Increase the Practice of Hand Washing with the Correct 7-Step Technique for 2 Minutes for Doctors Conducting Vaginal Deliveries from Baseline to 80 % in 4 Weeks Journal of Patient Safety and Quality Improvement. 2022; 10(4):123-130. Doi: 10.22038/PSJ.2022.67558.1373</p>	

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Introduction

Problem description:

Hand washing is a significant event and one of the fundamental habits to avoid the spread of infection from service provider to service seeker and to maintain sepsis during any medical or surgical operation. Inadequate or incorrect handwashing procedures commonly result in the unintended cross-infection of patients and medical personnel.

By sneezing, coughing, or rubbing your eyes, you can transmit germs from your hands to your other hands, which can then be transferred to high-touch surfaces or other people, which causes cross-contamination (1). In a healthcare setting, hand washing is an efficient way to prevent infection, yet studies reveal that healthcare workers only wash their hands half as thoroughly as they should (2).

According to the World Health Organization (WHO), hand hygiene improvement programs can reduce the risk of infection by up to 50% and produce financial benefits that are typically 16 times the cost of implementation (3).

Local problem description:

Although hand-washing was being done in our labour room, it was discovered that there was potential for improvement because of the frequent team changes every month, the lengthy duty hours that students had to put in, and sometimes a lack of hand-washing.

Available knowledge:

Rosenthal VD et al. discovered in an ICU setting in Argentina that focused education and frequent performance feedback produced a sustained improvement in hand hygiene compliance, coinciding with a reduction in nosocomial infection (4). A mixed-methods analysis of hand hygiene in Zanzibar was conducted by De Barra M et al. to understand infection prevention behaviour in maternity wards and found that hand washing is a widely accepted measure to reduce nosocomial infection (5). Rationale: The idea behind this project is to reduce infection among health care workers and inculcate the behaviour of hand washing in aspiring future gynaecologists.

Our goal was to establish the habit of hand washing and make a behaviour change among the junior residents who were performing vaginal deliveries by performing quality improvement (QI) projects before that problem was properly analysed by plan-do-study-act (PDSA) cycles.

Specific aim:

To increase the practice of hand washing with the correct 7-step technique for 2 minutes for doctors conducting vaginal deliveries from baseline to 80% in 4 weeks.

Materials and Methods

Context:

This study was carried out in the labour room of Pt. B. D. Sharma Postgraduate institute of medical sciences, Rohtak, a tertiary care hospital in the Indian state of Haryana, which houses the Department of Obstetrics and Gynaecology. This hospital does 7,000 to 8,000 vaginal deliveries annually, and we alternate two teams with a total of nine junior residents every two weeks who work on the day and night shifts while performing vaginal deliveries in the labour room. The junior residents who were performing the vaginal deliveries served as the focus group for the intervention. Every resident was aware that hand washing was important. but the labour room lacked a clear policy statement; therefore, it was determined to address this systemic issue as part of our labour room's quality improvement project. Compliance was defined as the practice of handwashing with the correct 7-step technique for 2 minutes.

Sample Size:

Nine doctors were used as a sample size in each of the labour rooms' two 12-hour shifts. The team consists of junior residents (JR) from every admission batch, i.e., three JR1, three JR2, and three JR3, which makes nine doctors in each shift. The sample size was decided as per the department policy, where the labour room consists of one senior consultant, one senior resident, and nine junior residents, where the junior residents were the sample while the consultant and senior resident were the motivators.

The doctors were observed performing vaginal deliveries and correctly following the two-minute handwashing protocol. To increase the improvement and maintain the consistency of the behaviour change, teams in ward posting were also involved in the advanced phase of the project as per their rotation duties.

Inclusion criteria:

All the junior residents who were posted in the labour room during that time frame and conducting the deliveries were included in the study.

Exclusion criteria:

All those observations were excluded from the study, in which Doctors were not performing handwashing. Doctors who were not performing the correct 7 steps of hand washing Doctors who did not perform hand washing followed the 2-minute time limit.

Formula used to check Indicator

Indicator	Hand washing for 2 minutes with the correct 7 steps is required before conducting the vaginal delivery.
Numerator	Total number of doctors who washed their hands correctly in 7 steps for 2 minutes.
Denominator	Total number of doctors who conducted the vaginal delivery

Validity:

While washing their hands, the doctors who were the subject of the study for carrying out vaginal births were unaware that they were under watch.

To maintain the observation's blinding, it was conducted using unbiased observers who were not the same each time.

Reliability:

The reliability of the observations was assessed using the inter-rater reliability approach. Data from observers were collected, and measurement reliability was assessed. All observations were made by impartial, volunteer, and anonymous observers. At least two or more observers watched the same doctor at once.

Intervention:

The study done in two phases
Phase I: the preparatory phase:

Statistical analysis:

Indicator, numerator, and denominator were determined based on the analysis of the data and performed as per the formula. Indicator= numerator/denominator multiplied by 100

Indicator:

Hand wash for 2 minutes with the correct 7 steps before conducting the vaginal deliveries.

Numerator:

The total number of doctors who wash their hands correctly in 7 steps for 2 minutes.

Denominator:

Total number of doctors who conducted the vaginal delivery.

To analyse the baseline data and conduct external QI activities to provide the resources required for improvement. (Duration: 5 days)

Phase II: implementation phase:

The PDSA cycles were used to implement the QI cycles. (4 weeks)

Phase I: the preparatory phase:

With the following questions in mind, a four-person quality improvement team was established to gather baseline data and determine the severity of the hand washing problem, which was identified as a dysfunction. What gap is there? Whether the proper steps are being taken What are the issues preventing it from being done? In addition to the team's core four members, the nursing sister in charge was also a member, and a few unbiased observers were enlisted to evaluate the hand washing procedures (voluntary interns who were already posted in the labour room).

Only a few doctors were using the correct 7-step approach for hand washing throughout the morning shift in the labour room; according to baseline data collected over 5 consecutive days, only 10% of doctors were doing so.

After doing a problem analysis using a fishbone diagram to look for issues with people, policy, place, and procedure, these observations were noted.

Policy: Every resident is aware that they need to wash their hands.

People: lack of enough workforce to tackle the workload and unmotivated residents

Place: Soap is not always readily available.

Procedure: Numerous deliveries are happening simultaneously, and the handwashing station is located some distance from the few delivery beds.



Figure 1: Fish Bone Analysis of dysfunction of handwashing in the labour room

After observing and analysing the baseline data, it was decided that basic resources for change, such as the availability of wall clocks, water, and soap, needed to be in place before the change intervention was implemented. The department head, the consultant in charge of the labour room, the in-charge nurse, and the authorities were all considered for this. The next meeting's schedule, place, and agenda were selected for quality assurance, and the QI team was ready to start the implementation stage.

Phase II: implementation phase:

PDSA 1: It was tested in the first PDSA change intervention that making hand washing aware of the doctors who were conducting the delivery in the labour room through the introduction of the policy, demonstration, and performance of hand washing would give it weight age. An oath was prepared in Hindi and students swore to do hand washing. Data on hand washing was collected and it increased from 10% to 55.5%. The change intervention was successful, so it was adapted and continued

for cycle 2, and at the meeting for feedback, it was found that sometimes soap was not available.

PDSA 2: A change intervention to increase the availability of soap was introduced in the cycle, and it was found that the data further increased by 55.5% to 69.2%. The change intervention was successful, so it was adapted and continued for cycle 3.

PDSA 3: The change intervention adapted for cycle 3 was the reassignment of work for every doctor who was posted in the labour room among junior residents (JR) 1, 2, and 3, and it was emphasized that teamwork will lead to a decrease in the burden of junior residents 1 and 2, so JR3 was also involved in conducting the vaginal delivery. Although the percentage remained constant during this cycle, a decline of 3% was seen; the cause was a switch in the weekend team. However, a new idea was introduced by including all junior residents who were working in the ward. The QI team was divided into four individuals, and they went to their work area to avoid absenteeism in

the sensitization meeting. QI members informed JRs about the project and the progress made thus far, and all JRs appeared motivated and eager to make the change. PDSA 4 started.

PDSA 4: A new change intervention was applied, and data was observed. To our surprise, the data covered the loss of 3 % and rose to 75%

As the QI team decided to bring about change in 4 weeks, they could reach close to the target of 80%, but a lag of 5% was observed, and reasons were sought in the "why tool." Although every JR was motivated and washing their hands, it was discovered that support staff appointments were

insufficient compared to the workload in the labour room, which caused some delay in shifting the patients from delivery tables and attending to them.

Now the JR and QI teams themselves decided to reach the target, and the project was extended for one more week, i.e., PDSA 5.

PDSA 5: Continue after cycle 4, with continued motivation, and the labour room team could meet the 80% target.

Following this, sustenance was also made sure through continued PDSA cycles, which lasted 10 weeks and covered all junior residents on every shift with a sustenance of 90-100%.

Table 1: PDSA cycles done in labour room

PDSA1	Plan	Do	Study	Act
Week 1	1. The policy was all-encompassing. 2. The junior residents were given information about a meeting with the labour room team for change intervention, and an interactive discussion on the policy statement was conducted. The junior residents conducted independent demonstrations, assisted out, and carried out independent hand washing procedures.	The change intervention has been implemented. Unbiased observers provide regular feedback on the process.	The value received after a week was 55.5%. feedback that soap is not available all the time.	The intervention for change continued. As reported by the comments, the nurse In-charge labour room reassured to the QI team, that the student would have access to soap every day of the week. Again, unbiased observers made sure that soap was available.
PDSA 2	Plan	Do	Study	Act
Week 2	Soap was made available. More involvement of junior residents Junior residents were motivated further by sending handwashing awareness templates via social media and a WhatsApp group.	Cycle continued as per plan.	The improvement in the second week over the first week was 69.2%. Feedback was received that junior residents are working as per their seniority and a few students are overloaded to take vaginal deliveries.	Change intervention and adaptation are still ongoing. Motivation is achieved by reassigning work and limiting the total number of deliveries made by each student in order to avoid extra load and impeded hand washing.
PDSA	Plan	Do	Study	Act
Week 3	Reassignment of work done for every resident available in the labour room	Cycle continued as per plan.	Hand washing by junior residents has decreased slightly, to 66.1%. The feedback received revealed that the Sunday team of the day was unmotivated because they were an external team of junior residents who came to work in the labour room to relieve the regular team of labour room residents.	The change intervention was modified, and all department residents were made aware of hand hygiene and encouraged to take the motivation class again.
PDSA 4	Plan	Do	Study	Act
Week 4	The sustainability plan was implemented, students were further motivated, and an unbiased observer noted Week 4 progress.	Cycle continued as per the plan.	An improvement was observed from the previous week, i.e., 75%	A one-week extension was given because the QI team was unable to reach the desired goal of 80% by the conclusion of week 4.
PDSA 5	Plan	Do	Study	Act
Week 5	Motivation continued with all the junior residents.	Cycle continued as per the plan	An improvement was seen, and the desired goal was achieved until 80%.	An improvement was seen, and all the residents were congratulated on receiving the desired goal and

Measures:

The data was obtained in percentages. The outcome measures were calculated using the indicator of hand washing with the correct 7-step technique for 2 minutes for doctors conducting vaginal deliveries. The numerator was the total number of doctors in which the correct 7-step handwashing technique was used for 2 minutes, and the denominator was the total number of doctors performing vaginal deliveries.

Analysis:

In order to analyse the data and implement

change interventions, baseline data was first gathered, and it was discovered to be only 10%. Weekly data was then collected by unbiased observers in PDSA 1, 2, 3, 4, and 5. Every meeting, a tried-and-true change suggestion is presented.

In the first PDSA, the motivation of junior residents and the policy statement declaration indicate an improvement from 10% to 55%. Subsequently, PDSAs 2, 3, and 4 show data of 69.2%, 66.1%, and 75%, respectively. A time series graph displaying the weekly variation in different PDSA cycles.

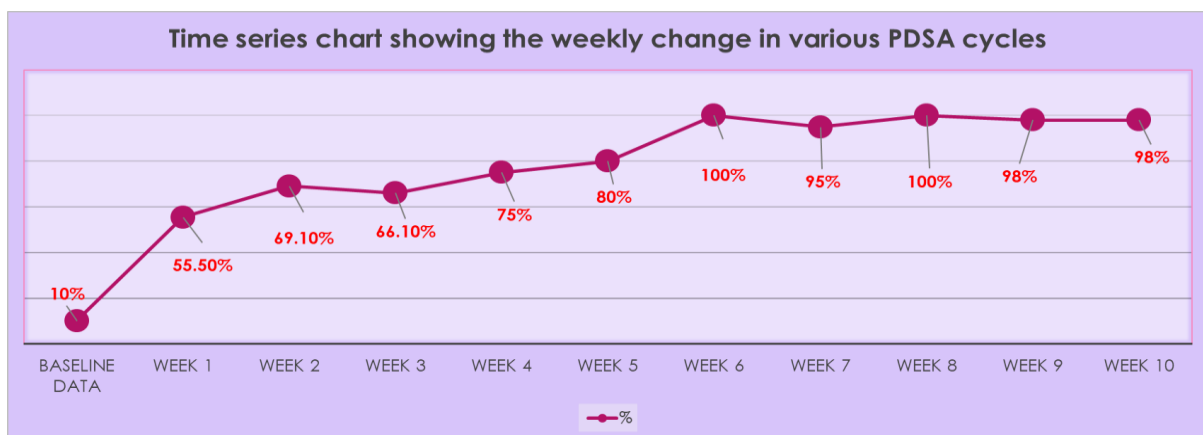


Fig 1: Time Series weekly changes in various PDSA Cycles

Results

Only 10% of doctors were conducting vaginal births with the proper hand washing procedures when the baseline data for the quality improvement project were received. After the first PDSA, the introduction of policy statements and interactive lectures with demonstrations resulted in an increase of 55.5%. In the second, PDSA, soap availability was provided, and it further improved by 69.1% in the third PDSA through the distribution of work among junior residents 1, 2, and 3 to spread out the total number of deliveries made by each resident on duty to avoid overloading JR 1 and 2. Residents were given ample opportunities to wash their hands. The findings revealed a modest fall of 3%, while they were still sustained at over 65%. The source of this was investigated, and it was discovered that residents' teams had

changed due to weekend shift duty changes. In PDSA 4, it was decided during the QI meeting to re-energize all junior residents, and the cycle continued. By the end of the fourth week, there had been a change from 66.1% to 75%, but this was less than the anticipated response of 80%. The time series plot in Figure 2 shows an increase in trend from baseline data. In the fifth week of the extended project, the specific goal was achieved. After the fifth week and through the tenth, sustenance was observed.

Discussion**Summary:**

Despite initially requiring some time, the desired goal was eventually accomplished. Later, the project was successful, and we could produce a change that was nearly expected because of the QI team's ongoing enthusiasm, drive to complete the

assignment, and awareness of handwashing. With baseline data available at the beginning of the project, the issue was assessed with the following considerations in mind: why is hand-washing not being done? Where is the hand-washing gap? What were the justifications if it was not done using the proper procedures? The QI team discovered numerous minor issues. The scrub station's lack of a consistent supply of water and the availability of soap were minor issues, whereas job overload, numerous deliveries taking place at once, and insufficient staffing in the labour room were severe ones. The handwashing project was successful due to the availability of water being guaranteed before the start of PDSA 1, the creation of awareness in PDSA 1, confirming the availability of soap in PDSA 2, the redistribution of work and reinforcement of the available knowledge for handwashing, and motivation in PDSA 3. The QI team increased the practice of hand washing with the correct 7-step technique for 2 minutes for doctors performing vaginal deliveries from baseline to 75% in 4 weeks.

It took one more extra week to reach the desired goal, as the QI team remained enthusiastic even when it could not reach the desired goal of 80%.

Ignaz Semmelweis, regarded as the father of handwashing and the saviour of mothers, was the person who initially popularized the practice. He made doctors wash their hands and then let them deliver babies in the labour room for a year. As a result, the number of maternal deaths from puerperal fever decreased. (6) Even though it has been taught as a fundamental habit since childhood, surgical hand washing or other appropriate hand washing methods are still insufficient. In healthcare facilities in lower middle-income countries (LMICs), a meta-analysis was conducted to estimate birth attendants' hand hygiene compliance. Gon G et al. discovered that only 1.3% to 38% of these moments were spent washing their hands before performing vaginal examinations and before delivering a baby. Similar results were obtained in our study when we evaluated the baseline data, i.e., only 10%. (7). Gon G. and colleagues from Ghana conducted a multicentre time-and-

motion study in Zanzibar, and the results were published online in 2018. They also discovered that only 9.6% of birth attendants practiced adequate hand hygiene before aseptic operations. (8) Yawson AE and Hesse AA carried out observational research to examine obstetric infection management in Ghana and discovered that supplies are few and even when they are available, they are not used appropriately. When doing fishbone analyses, we discovered that occasionally supplies were short, but occasionally students were not washing their hands because they were preoccupied or unmotivated. (9)

To raise and maintain health care worker (HCW) compliance with hand hygiene (HH) guidelines from 87% to 95% within 9 months; McLean HS et al. undertook a study in two pediatric departments. (10) Additionally, they used PDSA cycles to strengthen and maintain hand hygiene practices. Linam WM et al. discovered that multimodal interventions, such as human-factor interventions, and real-time individual performance feedback, improved hand hygiene compliance from baseline data in a study of pediatric health care professionals. (11) As in our study, we improved from 10% to 55.5% after implementing a fundamental change intervention in motivation. Additionally, through a series of change interventions, we could increase the percentage of doctors performing vaginal deliveries who washed their hands correctly for two minutes from baseline to 80%. Although we could do this in five weeks as opposed to four, the quality improvement team's consistent efforts and the department's junior residents' motivation were key factors in our success.

Limitation: The biggest constraint was the low number of general duty support workers, and higher authorities were informed of this to increase workforce in the labour room, particularly near the delivery table area, for easy patient switching on the table.

Conclusion

Residents' resistance to change was visible at the beginning of the project; this issue was resolved through hand-washing

demonstrations in front of small groups of the target community. The success of any reform requires an engaged team, and the QI team chose hand-washing as the fundamental necessity that every doctor should practice. In our perspective, accepting the "problem" is the first step to improving any quality. When we investigated the compliance of hand washing, we initially assumed that it must be present. However, the baseline assessment showed that it was just 10%. The second step is to analyse the issue and create a plan based on the logistics and local environment that are available. While some issues may appear minor to outsiders, they may be significant barriers to quality improvement. A QI team should decide how to approach the problem in the third step. In response to all of this, our quality assurance team readily accepted the main problem area, which was the lack of water and soap. As soon as these minor issues were resolved, the students became more motivated every day thanks to the QI team's encouragement and support, and they formed the habit of washing their hands for 2 minutes with the correct 7 steps.

This behaviour now shows the success of our effort. Authors' Contribution: All the authors contributed to the execution of the study, including the writing, editing, and finalization of the manuscript.

Acknowledgement

The deputy medical superintendent and medical superintendent of the Institute provided external quality improvement support for ongoing supplies. The LaQshya mentors, especially Dr. Manju Puri, provided ongoing inspiration to the QI team. Since the Vriddhi Project was introduced in the state of Haryana as part of the LaQshya Quality Improvement Program, we would like to give our heartfelt thanks to it.

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