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Performance Feedback should be Repeated Within a Year to Maximise Handwashing Rates in the Critical Care Unit

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Maximising Handwashing Rates in the critical care unit through yearly perfomance feedback

Abstract

Handwashing following patient contact reduces the incidence of nosocomial infections. Despite this, hand-washing rates by health workers are often poor. Feedback on handwashing has been shown to significantly improve handwashing rates. This study determined the optimum time to repeat performance feedback on handwashing rates of hospital staff in order to maximise the incidence of handwashing. The baseline incidence of handwashing by staff following patient contact was determined by covert observation. This was followed by a period of feedback on handwashing performance by means of histograms displayed in the Unit. Handwashing incidence was reassessed six and 12 months after the feedback ended. Performance feedback induced significant increases in handwashing incidence amongst Nurses ($p=0.0433$), Resident Medical Officers ($p=0.0134$), Specialists ($p=0.0021$) and Radiographers ($p=0.0001$), and non-significant increases in handwashing rates amongst Wardsmen/women and Physiotherapists. Overall handwashing incidence declined significantly ($p=0.0001$) 12 months post-feedback. This study demonstrated that feedback should be repeated within 12 months in order to maximise handwashing rates with the minimum intervention.

Introduction

The cost to the Australian health system of surgical nosocomial (hospital–acquired) infections alone has been estimated at $60 million per annum (1). Contaminated hands have been shown to be the most frequent agent of spread of infectious organisms in hospitals (2). Not surprisingly, handwashing following patient contact has been shown to significantly reduce the incidence of nosocomial infections (3). Despite this, hand-washing rates by health care workers (HCWs) are often less than ideal. Various studies have shown that the incidence of handwashing following patient contact by staff ranges from 9 to 63 percent (3-8).

Performance feedback, in which covert observation is carried out to determine the incidence of handwashing and charts of handwashing rates are displayed, has been shown to significantly improve handwashing rates amongst HCWs. Tibballs (6) found that the handwashing rates of doctors increased from 10.6 to 64.8 percent following a period of performance feedback.

Van de Mortel and Heyman (5) looked at the effects of performance feedback on handwashing incidence amongst all staff to come into contact with patients in the Intensive Care Unit. They found a significant difference between professions in the incidence of handwashing, and a trend of increased frequency of handwashing following implementation of performance feedback. This was significant in two of the six professional groups studied.

Several questions remained unanswered by these studies. Firstly, is performance feedback effective when used repeatedly or does the novelty wear off? Secondly, what is the optimum time to repeat performance feedback in order to maximise handwashing rates whilst minimising the amount of intervention needed? One may need to minimise the frequency of this type of intervention in order to decrease the workload and associated costs, and prevent the intervention from losing its impact.

The primary aim of this study was to determine the optimum time to repeat performance feedback on the handwashing rates of hospital staff in order to maximise the incidence of handwashing, thereby decreasing nosocomial infection rates and hospital costs. In addition, as performance feedback was trialed in this unit 2 years previously, this study offered an opportunity to determine if the differences in handwashing incidence previously noted between professions would still be seen,. It was also used as a tool to determine whether staff who had previously been exposed to performance feedback would still respond to this intervention in a positive manner.

The null hypotheses to be tested included:

1. that profession would not influence the incidence of handwashing following patient contact,
2. that performance feedback would not increase the incidence of handwashing following patient contact,
3. that the incidence of handwashing would not decline significantly 6 months after feedback had ceased when compared to the incidence measured during the performance feedback phase, and
4. that the same was true for 12 months after feedback.

The validity of the second hypothesis rested on the assumption that a move to a new premises with better handwashing facilities during the course of this study would not influence the results. Please refer to the discussion for justification of this statement.

Operational Definitions

1. Any action to cleanse the hands using a handwashing agent was defined as handwashing. 2. Any contact by the staff member's hands (whether gloved or ungloved) with the skin, secretions, excretions or blood of a patient, or with an invasive device was considered patient contact. Contact with bed linen, monitoring equipment or medical records was not defined as patient contact.

METHODS

Setting

The study was carried out in the Critical Care Unit at Wollongong Hospital. The Unit moved from the old premises described in van de Mortel and Heyman (5) to new premises after the baseline phase. This is a 16 bed unit, which is divided geographically into a 10 bed general Intensive Care (ICU) and a six bed High Dependency (HDU) area. The patients are accommodated in individual bays that have side walls whilst the fronts of the bays are open to the central area of the unit. Each patient bay in ICU has its own sink with a Triclosan Skin Cleanser (Triclosan 1%, methylhydroxybenzoate and propylhydroxybenzoate) pump, a Chlorhexidine Surgical Handwash (Chlorhexidine gluconate 4% w/v) pump and a Chlorhexidine Surgical Handwash (Chlorhexidine

gluconate 2% w/v) pump. There is one sink to every two bays in the HDU with similar handwashes available.

Subjects

The subjects include all staff who came into patient contact during the period of the study: 70 Registered Nurses (RNs), 44 Wardsmen/women (WM/W), 17 Physiotherapists, 38 Resident Medical Officers and Registrars (RMOs), 15 Radiographers (X-Ray), and 30 Specialists.

Study Design

The study was divided into four phases:

- Phase 1: Baseline incidence
- Phase 2: Performance feedback
- Phase 3: 6 months post feedback
- Phase 4: 12 months post feedback

Phase 1: Baseline incidence

During phase 1, which was carried out over a 5-week period in April and May 1997, the incidence of handwashing by all staff coming into patient contact was observed covertly to establish baseline data. The names of individual staff members were not recorded anywhere.

Six nursing staff who had been instructed in the method of observation recorded handwashing incidence. Five of the six observers were participant observers, while the sixth was a nurse working in the unit who also acted as a paid research assistant. The latter collected data as a participant observer during her rostered shifts, but also collected data outside her rostered shifts under the cover of working on another research project. Those nurses acting as data collectors were not included as subjects. Data were collected on all three shifts, whenever the observers were able to watch staff-patient interactions. Four of the six data collectors were senior staff who frequently worked as shift supervisors and at such times did not have a patient load. These observers were ideally placed to observe staff-patient interactions throughout the shift and on doctors' rounds, during routine patient turns by WM/W, and during routine radiography and physiotherapy. This allowed comprehensive coverage of professional groups and individuals on different shifts. One data collector dropped out of the study after the performance feedback phase (maternity leave) and one after the 6-month post-feedback phase (new job). The former was replaced by someone who had acted as a data collector for the previous study by van de Mortel and Heyman (6). The latter was not replaced.

Phase 2: Performance feedback

Phase 2 covered a period of two weeks from May to June 1997. Staff members were aware during this time that their handwashing behaviour was being observed but were unaware of the identity of the data collectors (this was determined by asking staff after the study had finished if they were aware of the identity of the data collectors). Bar charts displaying the handwashing performance of the various staff groups were placed above the sinks at the beginning of this phase, and were

displayed for 2 weeks. These charts were replaced with the performance feedback data, which were also displayed for 2 weeks.

Phases 3 & 4: 6/12 months post feedback

After a 6 month interval (phase 3) in which no observations or interventions occurred, covert observations were again made over a two-week period to determine the incidence of handwashing six months following performance feedback (phase 4). Phases 3 and 4 were repeated to determine the incidence of handwashing 12 months following performance feedback.

Statistical analyses

The significance of differences observed in handwashing incidence between staff groups was assessed via a Chi^2 contingency test. An analog of Tukey's multiple comparison test suitable for categorical data was used to determine which of the groups differed, as recommended by Zar (9). The data were analysed for difference over time via Chi^2 contingency tests (9).

Ethics

Observing staff covertly has ethical implications. As subjects may modify their behaviour if they are aware that they are being observed, it is necessary that a study of behaviour such as this must be conducted covertly in order to collect accurate data.

Approval for this study was gained from the Human Research Ethics Committees at Southern Cross University (ECN-97-09) and the University of Wollongong (HE 96/233). The latter committee deals with questions of ethics related to research on humans conducted in hospitals belonging to the Illawarra Area Health Service. The Director of Health Services Development (Illawarra Area Health Service) and the NSW Nurses Association also approved the study.

RESULTS

Baseline incidence

The baseline incidence of handwashing (phase 1) following patient contact can be seen in Figure 1 and summarised as:

- WM/W 84%,
- RNs 71%,
- Physiotherapists 92%,
- RMOs 50%,
- X-Ray 9%
- Specialists 25%.

The incidence for all staff was 61% based on 143 observations. There was a significant difference in the incidence of handwashing between professions ($p = 0.0001$) (Fig 1). Physiotherapists washed their hands significantly more often than all other groups with the

exception of WM/W who in turn along with RNs washed their hands significantly more often than RMOs, Specialists and X-Ray. Resident Medical Officers washed their hands significantly more often than X-Ray.

Phase 2: Performance feedback

Following performance feedback (phase 2), the overall incidence of handwashing amongst staff was 83% (p=0001). This figure was based on 399 observations. Handwashing rates were as follows: WM/W 89%, RNs 86%, Figure 2 shows the handwashing rates were as follows:

- Physiotherapists 100%,
- RMOs 81%
- X-Ray 64%
- Specialists 73%

Performance feedback induced a significant increase in handwashing incidence amongst the following groups:

- RNs (+13%) (p= 0.0433),
- RMOs (+31%) (p= 0.0134),
- X-Ray (+55%) (p= 0.0001)
- Specialists (+48%) (p= 0.0021).

There were non-significant increases in handwashing rates for:

- WM/W (+5%) (p= 0.4508)

- Physiotherapists (+8%) (p= 0.0578).

Phase 3: 6 months post feedback

The overall incidence of handwashing following patient contact six months post-feedback was 76% (p=0.0606). This figure was based on 260 observations. The percentages for specific groups were (Figure 2):

- WM/W 78%
- RNs 84%
- Physiotherapists 77%
- RMOs 71%
- X-Ray 74%
- Specialists 73%.

Handwashing incidence 6 months after the feedback phase had ended had, in most cases, not changed significantly:

- WM/W (-11%) (p= 0.0884)
- RNs (-2%) (p= 0.7651)
- Physiotherapists (-25%) (p=0.0007)
- RMOs (-10%) (p= 0.2427)
- X-Ray (+10%) (p= 0.3152)
- Specialists (unchanged)

Phase 4: 12 months post feedback

Covert observations were carried out again 12 months after the last performance feedback had been given. The incidence of handwashing following patient contact at this time (Figure 2) was:

- WM/W 63%
- RNs 89%
- Physiotherapists 100%
- RMOs 48%
- X-Ray 56%
- Specialists 33%

The incidence of handwashing following patient contact amongst all staff was 65% (this figure was based on 125 observations), which represented a significant decline (p=0.0001) from the incidence during the feedback phase.

Handwashing incidence had declined significantly when compared to the incidence post-performance feedback in the following groups: WM/W (-26%)(p=0.0033), RMOs (-33%)(p=0.0063), and Specialists (-40%) (p=0.0255). There was a non-significant decline in handwashing incidence amongst X-Ray technicians (-8%)(p=0.6975), whilst the incidence remained unchanged amongst Physiotherapists and increased slightly amongst RNs (+3%)(p=0.9737).

DISCUSSION

Effect of performance feedback

Despite the fact that performance feedback had been trialed in the unit several years previously (5), the feedback had a positive effect on handwashing incidence. Statistically significant increases in handwashing incidence occurred in four of the six groups and non-significant increases occurred in the remaining two groups when performance feedback was instituted. These results are in agreement with those obtained by van de Mortel and Heyman (5), except that in the latter study the improvement in handwashing incidence post-feedback was only significant in two groups. It may be that the shorter feedback phase used in the current study had a greater impact than the extended feedback phase used by van de Mortel and Heyman (5).

The proportional improvement in handwashing incidence amongst doctors was also similar to that found in the study conducted by Tibballs (6) although the baseline incidence of handwashing recorded for the doctors in his study was considerably lower and didn't improve to the degree seen in the Wollongong study following feedback.

The use of participant observers to collect some of the data may have meant that some behaviour went unnoticed if the observers became busy with their own work. As this method was used throughout all phases of the study, it should not have had an effect on the change in percentages between phases. In addition, the use of shift supervisors and a research assistant to collect data should have minimised the loss of data due to patient load. Several of the data collectors did not

carry out observations in all phases of the study. This should not have biased the results as all data collectors were given specific instructions regarding exactly what constituted a handwash, and in which situations handwashing was required.

Handwashing as a function of profession

This study again showed marked differences between professions in the incidence of handwashing. Handwashing rates were consistently higher amongst nurses, physiotherapists and WM/W. Based on the current and previous data (5), it appears that the groups that have the worst incidence of handwashing and show the most marked improvement when performance feedback is instituted are the RMOs, Specialists and Radiographers. These groups may need to be targeted specifically in order to improve compliance with handwashing recommendations.

Several other studies have noted that handwashing incidence is much higher amongst RNs than doctors although none have advanced any explanation for why that might be so (10,11). It may be a gender-related phenomenon, as studies of school children and the general adult population have shown that females of all ages are more likely to handwash than males, and score higher on handwashing technique (12,13). The proportion of nurses who are female is considerably higher than the proportion of female doctors. In this study, 90% of the nurses were female whilst 45% of RMOs and 6% of Specialists were female.

A similar discrepancy in handwashing incidence was seen between RMOs and Specialists. The former group had higher handwashing rates and had a much higher proportion of females than the

latter group. Sixty-five percent of Physiotherapists were female, while only 27% of Radiographers were. This theory doesn't explain the high incidence of handwashing by WM/W, 95% of whom were male. Future studies may need to record the gender of the persons being observed in order to test this theory.

It is interesting to note the quite marked differences in handwashing incidence within professions at different hospitals. For example, the baseline incidence of handwashing amongst doctors in Tibballs (6) study was 10.6% whereas at Wollongong Hospital it was 25% amongst Specialists and 50% amongst RMOs. Differences in unit size, workload, and environmental factors may be responsible. These are all areas that could be investigated.

It is possible that the move of the Critical Care Unit to a new building that had better handwashing facilities influenced the results, however, it is unlikely for several reasons. Firstly, if the improvement in the frequency of handwashing following performance feedback was due to the better handwashing facilities then it should have been maintained over time, which didn't occur. Secondly, performance feedback was trialed in the Critical Care Unit at this hospital several years earlier (5) and produced an improvement in handwashing rates in the absence of any improvement in handwashing facilities.

Optimum time to repeat feedback

Three of the six staff groups showed significant declines in handwashing rates 12 months after performance feedback had ended and one group showed a non-significant decline. In addition, if

one ignores profession, the incidence of handwashing rose to 83% following performance feedback from a baseline of 61%, falling to 76% at 6 months and 65% at 12 months. The overall handwashing incidence had almost returned to the baseline level at 12 months and this decline was statistically significant. Based on these data we suggest that a performance feedback program that is instituted to improve compliance with handwashing guidelines should be repeated within 12 months.

CONCLUSION

Performance feedback has again been shown to deliver significant increases in staff compliance with handwashing requirements. This study has demonstrated that feedback should be repeated within 12 months in order to maximise handwashing rates with the minimum intervention. Previous findings of significant differences in handwashing incidence between professional groups were repeated in this study. Future studies are needed to determine the causes of differences in handwashing performance between professions and between the same professions in different hospitals. Knowledge of the factors that are influencing the decisions of staff to handwash may help us to formulate more effective programs aimed at increasing the incidence of handwashing amongst HCWs.

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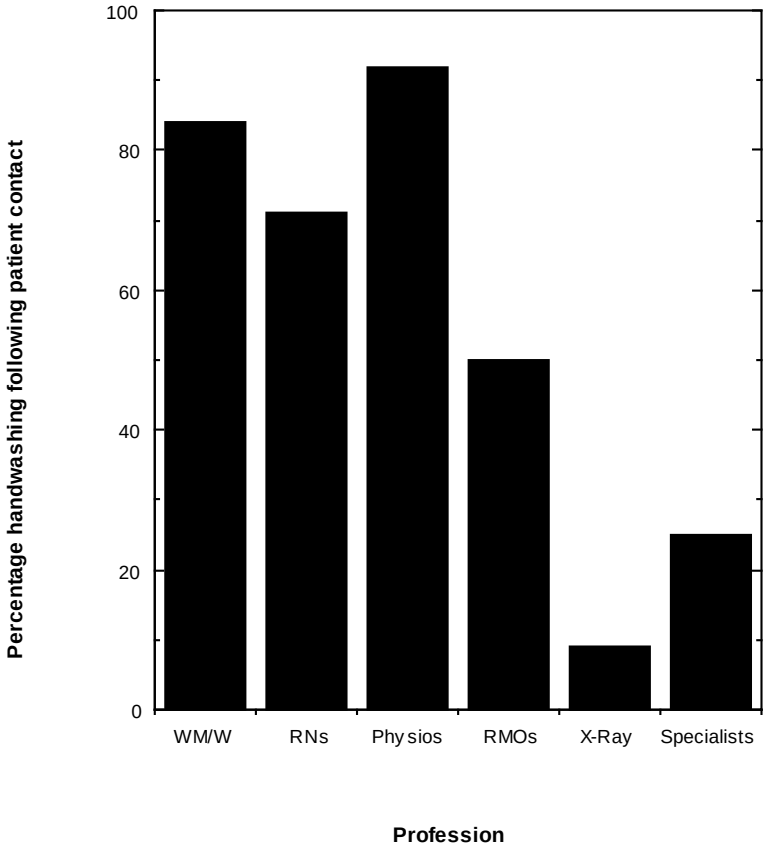

Fig 1. Baseline incidence of handwashing following patient contact by profession.

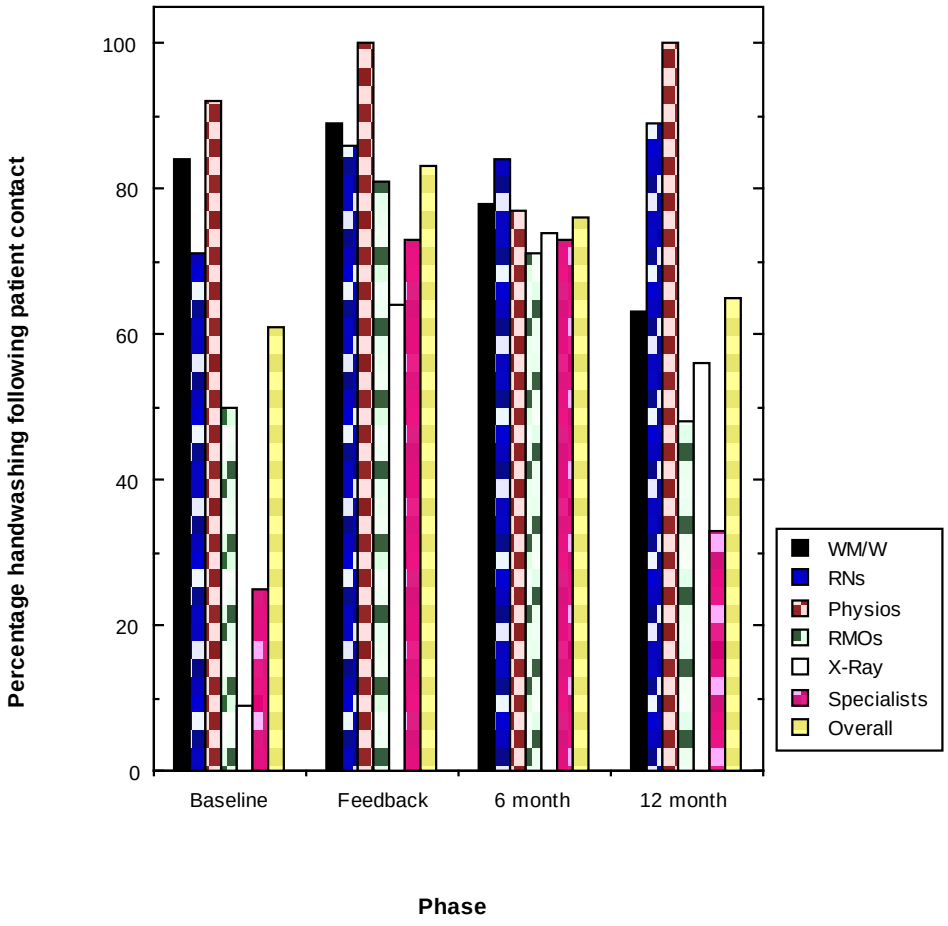

Fig 2. Percentage of staff handwashing following patient contact during the baseline and performance feedback phases, and 6 and 12 months after performance feedback ended.