ORIGINAL ARTICLE

Hand washing compliance among healthcare staff in Intensive Care Unit (ICU) of a Multispecialty Hospital of North India

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Abstract

Introduction: Hand hygiene is the single most important strategy to prevent HAIs. The present cross sectional study was conducted in ICUs to assess the hand washing practices being followed among health care workers and the factors that motivate or inhibit hand washing.

Results: During two week analysis, 2400 hand washing opportunities were observed. Hand washing adherence rate was 86.0%, with highest compliance among nurses (94.0%). Compliance was (95.0%) after patient contact than 72.5% before contact. More than 90.0% staff was aware about facts viz. diseases prevented by hand washing (96.2%), ideal duration of hand washing (92.6%), reduction of HAI with hand washing (98.0%) etc. Reasons for non-adherence emerged as work pressure (94.2%) and unavailability of materials (82.4%).

Conclusion: The level of compliance (86%) is below the need to be there in ICU otherwise. Easy access to hand-rub solutions, adherence measurement and institutional commitment might contribute to staff sensitivity to hand hygiene practices.

Key words

Hand washing, Compliance, Intensive care unit, Direct observation, Product utilization, Questionnaire

1 Introduction

Hand hygiene is the single most important element of strategies to prevent Health Care-Associated Infection (HCAI) [1, 2, 3]. With the emergence of antibiotic-resistant organisms, the importance of hand hygiene within hospitals has re-emerged as a priority for the 21st century hospital administrators.

Every patient reporting to the hospital is potentially at risk of contracting hand-transmitted infections. Especially vulnerable groups include pregnant women, children, old people, and those with weakened immune systems. Still, Hand washing in hospitals is not given due emphasis by doctors, nurses and other health care staff. To assess this issue updated

guidelines intended to stimulate improvement in hand hygiene practices have been developed [4]. Along with it various tools and methodologies have been developed for hand hygiene measurement.

Direct observation of the hand hygiene behavior of health care workers is considered the "Gold Standard" [5]. It provides quantitative and qualitative information about when and why failures in hand hygiene occur and distinguish between hand hygiene practiced by different types of health care workers and patients or family members. Though it is a labor intensive and costly method [6] and requires uniformity in the selection and training of observers and in the recording of data [6, 7], it can change the behavior of staff members if they are aware that they are being observed [6, 7].

Product measurement is considered an indirect approach to assessing adherence to hand hygiene guidelines and the frequency of hand hygiene performance [8, 9]. Some studies [10, 11] have reported that product measurement is more sensitive to changes in hand hygiene behavior than is observation. Pittet et al. measured product use as part of a hand hygiene intervention [12, 13].

Surveying health care workers, patients, and family members is another indirect method of assessing aspects of hand hygiene adherence. Surveys can measure a range of hand hygiene components that cannot be measured by observation and product measurement viz. Staff knowledge, attitudes, and beliefs, perceptions of their own behavior and structural issues, such as the availability of hand hygiene products, product accessibility. Also surveys are helpful in learning what health care workers know and think and why health care workers adhere (or do not adhere) to hand hygiene guidelines.

These hand washing tools and methodologies have been used differently over the years. To overcome the gaps and discrepancies of various methods practices, in 2005, WHO launched Global Patient Safety Challenge under the slogan of "Clean care is safer care". A major component of the challenge is to evaluate and implement the guidelines for the promotion of hand hygiene in health care. It involves Member Nations for strengthening their capacity to improve patient safety, share experiences and to explore aspects that may influence its promotion among healthcare workers [14].

In a study by Marra et al. [27] using the observational methods, product use methods and electronic surveillance, the overall rate of hand hygiene adherence was found to be 62.3% (there were 2,249 opportunities for hand hygiene observed, and representing 1,402 cleansing episodes). Similarly, in a multi hospital study in Poland [28], nearly all (95.6%) hospitals had a written protocol for hand washing procedures, but according to the findings of study team, the compliance rates varied from 20 to 80%, although in most institutions was between 40% and 60%. The adherence rate in a twenty-four-hour observational study of hospital hand hygiene compliance by Randle J et al. [29] it was found that out of a total of 823 hand hygiene opportunities (HCWs, N=659; patients and visitors, N=164), compliance was 47% for doctors, 75% for nurses, 78% for allied health professionals, and 59% for ancillary and other staff (P<.001).

Also, it is proven fact that, organisms that cause nosocomial infections are most commonly transmitted by the hands of healthcare workers [4]. Therefore, hand-hygiene is considered to be the single best measure for infection control and it has been observed that rates of nosocomial infection are considerably reduced when healthcare workers act in accordance with recommended guidelines for hand hygiene [4-6]. Despite this fact, physicians' adherence to hand-hygiene practices remains consistently poor [6-8]. Notable factors for poor compliance include hand irritation [9], inaccessibility or shortage of hand-washing equipment [7-11], dense working conditions [9, 10, 12] and poor knowledge [8, 10].

The present study is also an attempt to fulfill the afore mentioned statement by providing useful insight into the prevailing practices of hand-hygiene and points out major obstacles in health care setting. Such sort of studies are lacking in India. So, the present study was planned to assess the knowledge and practices being followed among health care workers and to assess the factors that motivate, facilitate, hinder or inhibit hand washing.

2 Methodology

Government Medical College and hospital (GMCH), Chandigarh is a tertiary level multispecialty teaching hospital providing care to the residents of Chandigarh and the surrounding states. It is a 696 bedded hospital with an annual OPD of 4.5 lakhs and IPD of about 40,000. The hospital has two ICUs (Closed type ICU under anesthesia department), with a total of 18 beds. Both ICUs have conveniently located hand washing facilities.

It was a cross sectional study and whole of the ICU staff (64 health care members viz. clinicians, nurses and other paramedical staff) was taken as sample size. In a two week analysis, each ICU was visited for a week. The observer recorded all potential opportunities for hand hygiene in ICUs.

Adherence to hand washing was assessed using three methods i.e. Direct observation, Product utilization and Survey. This method was specifically chosen and the same was updated by Joint Commission (JCI) [15] in collaboration with The Association for Professionals in Infection Control, Epidemiology Inc., Centers for Disease Control and Prevention (CDC), the Institute for Healthcare Improvement (IHI), the National Foundation for Infectious Diseases, the Society for Healthcare Epidemiology of America and World Health Organization World Alliance for Patient Safety (WHO WAPS).

Table 1. Direct Observation method for measuring hand washing adherence rate

S.NO.	Observations	Opportunities	Adherence rate
1	Number of observed hand hygiene actions before patient contact	Number of hand hygiene opportunities before patient contact	Observations (A)/ Opportunities (B) * 100
2	Number of observed hand hygiene actions before aseptic task	Number of hand hygiene opportunities before aseptic task	
3	Number of observed hand hygiene actions after body fluid exposure risk	Number of hand hygiene opportunities after body fluid exposure risk	
4	Number of observed hand hygiene actions after patient contact	Number of hand hygiene opportunities after patient contact	
5	Number of observed hand hygiene actions after contact with patient surroundings	Number of hand hygiene opportunities after contact with patient surroundings	
Total	**A**	**B**	

Direct observation involved observing 200 opportunities per day. The observer visited the ICU on daily basis from 08:00AM till 200 observations are complete. The observations were noted both before and after the patient contact. This procedure was followed for a week (6 days) in each ICU. Averages for these were taken to calculate the adherence rate (the action is compared with the opportunity) as in Table 1.

The product utilization (liquid soap & alcohol based solution) was noted from the stock registers/record books of the materials issued/indented in the wards. It was found that one soap cake (120 gm.) is worth for 40 hand washings, while liquid alcohol rub is worth for 334 (approx.) hand washings/bottle (500 mL). The purchase done by staff was also taken into account. A check was kept on pilferage by daily noting stocks. The adherence to hand washing with product utilization was calculated as in Table 2.

A survey was also done by filling a pre-tested close ended validated questionnaire. Enveloped questionnaire was given to each health care staff and was asked to return it next day. The questionnaire was pertaining to intentions of adherence to hand hygiene, perception and knowledge, opportunities, steps, actions and attitude towards hand hygiene. It also involved the facts about difficulty of adhering to hand hygiene; risk of cross transmission of infections linked to non-adherence to hand hygiene.

Table 2. Product utilization method for measuring hand washing adherence

Parameters	Method of assessment
Number of indications for hand hygiene	1. Directly observed personnel (200 indications) 2. Divide the total number of indications by total time observed to obtain mean number of hand hygiene /hours 3. Multiply value obtains in step 2 by 24 to get mean number indications/day. 4. Obtain the patient census for period observations were made. 5. Calculate the mean number of indications for hand hygiene/day/patient by dividing mean number of indications/day by census value
Number of hand hygiene actual episode	1. Obtain data on volume of hand hygiene products used per month (soap/alcohol) 2. Divide the total volume used by the amount of product dispensed with each hit.
Hand hygiene adherence rate	Compute number of indications/month by multiplying indications for hand hygiene/day/patient by number of days in the month by mean monthly patient census. Obtain a hand hygiene adherence rate by dividing the total number of hits by total number of indications for that month.

3 Results

During two week (12 days) analysis in ICU, twenty four hundred (2400) hand washing opportunities were observed. Among 64 healthcare workers, 18 (28.1%) were physicians (including interns, residents), 34 (53.2%) nurses and 12 (18.7%) other health care workers (including technicians, physiotherapists (Table 3).

Table 3. Compliance rate for hand washing on Direct Observation method

Health care worker	Number of subjects		Opportunities of hand washing		Compliance (%)	
	n	%	n	%	n	%
Physicians	18	28.1	524	21.8	452	86.2
Nurses	34	53.2	1472	61.4	1384	94.0
Others	12	18.8	404	16.8	308	76.2

Table 4. Compliance rate for hand washing on product utilization method

Parameters	Steps of assessment	ICU
Number of indications for hand hygiene	Directly observed personnel (200 indications/time in hours)	216/6
	Mean number of hand hygiene/hour	36
	Mean number indications/day	864
	Census for observation period	16
	Mean number of indications for hand hygiene/day/patient	54
	Number of hand hygiene indications/month	25,920
Number of hand hygiene actual episode	Volume of hand hygiene products used per month (soap/alcohol)	88 soaps & 56 liquid alc. rub bottles
	Actual hand hygiene episodes	22,213
Hand hygiene adherence rate	Number of hand hygiene indications/Actual hand hygiene episodes	85.69%

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Out of the total opportunities, nurses had the highest number of contacts (61.4%) followed by doctors (21.8%), and allied health workers (16.8%), which contributed to a small percentage of total hand hygiene opportunities. The average compliance with hand washing was around 86.0% (Table 3 & Table 4), which differed significantly among professional health care workers with higher compliance among nurses (94.0%), followed by physicians (86.2%) and least by other health care staff (76.2%). Out of the total physicians, residents and interns mostly washed their hands only after making patient contact. Out of the average compliance of 86% hand washing, the more number of hand washing opportunities (95.0%) were after patient contact, while it was 72.5% before patient contact. Hand washing was done with alcohol in 96.04% of instances and it was with soap in 3.96% of instances. The average number of contacts per patient per hour was 11.

On survey method, it was found that more than 90.0% of the health care staff was aware about hand washing facts viz. diseases prevented by hand washing (96.2%), type of dirt tackled by hand washing (94.8%), ideal duration of hand washing (92.6%) and the extent of reduction of HAI by hand washing properly (98.0%). On the other end, reasons for non-adherence emerged as unavailability of soap at the washing area (82.4%) and work load pressure (94.2%).

4 Discussion

The present study was conducted to assess the Hand washing compliance among Healthcare Workers in Intensive Care Unit (ICU) of a Multispecialty Hospital. Such studies have not been done previously which has examined healthcare workers' hand-cleaning knowledge and practices and factors that motivate and inhibit hand washing. Like other studies [16-18], this study has also revealed low baseline rate (86.0%) of hand washing compliance by health care workers especially in ICUs.

Physicians freely acknowledge that hand washing is an important tool in the control of nosocomial infection, but complains it's also repetitive and dull [19-20]. There are a number of known factors affecting compliance with hand hygiene such as lack of time, high patient workload, patients' need taking priority, forgetfulness, lack of knowledge of importance of hand hygiene in preventing cross Infection, poor access to hand washing facilities, lack of institutional commitment and skin irritation to hand hygiene products [21-23]. In the present study, the main barriers to regular hand hygiene in descending order were lack of time, high patient workload, lack of knowledge of importance of hand hygiene in preventing cross Infection, lack of institutional commitment. Fortunately, respondents in this study believed that hand irritation was not a major element causing poor compliance; as opposed to other studies wherein hand irritation associated with hand-rub use was described as the most prominent barrier [21].

Like other investigators [24], we observed better hand washing compliance among nurses as compared to other health care workers. In our study, it was found that health care workers had the practice of washing hands after patient care, and similar sort of variations were demonstrated for hand washing among health care workers in the studies of Maydon et al. [25] and Credon et al. [26] This disparity might be explained by possible explanation; the desire on the part of healthcare workers to protect themselves from transmissible pathogens.

5 Conclusion

We found out that the average level of compliance with recommended hand washing practices among health care workers was 86%, which is below the need of to be there in ICU otherwise. Although the hand hygiene procedure is simple, its application is a complex phenomenon that is not easily explained or changed. Easy access to hand-rub solutions, adherence measurement and performance feedback as well as institutional commitment to hand hygiene promotion as a priority for patient safety, might contribute to health care staff sensitivity to hand hygiene. All future interventions must be supported by improving the facilities for hand-hygiene.

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