

A Study to Compare the Knowledge of Hand Hygiene among Nurses in a Public Tertiary-Care and a Private Corporate Hospital in Amritsar

Vardeep Singh Dhillon (B.D.S., M.H.A., P.G.D.H.P)

Assistant Professor (Hospital Administration), Department of Sports Medicine and Physiotherapy, Guru Nanak Dev University, Amritsar (Punjab), India

Abstract: *Background:* Hand hygiene is a simple, cost-effective way to reduce nosocomial infections, but the compliance with hand hygiene remains low. Nurses, due to the nature of their work, spend maximum time with the patients and therefore have higher number of opportunities to transmit infections from one patient to another. *Material and method:* A cross-sectional survey was conducted using World Health Organization's 'Hand Hygiene Knowledge Questionnaire for Health Care Workers'. Data obtained from the questionnaires was analyzed using descriptive statistics, and Pearson chi-Square Test. *Results:* there were significant gaps in the knowledge of nurses with respect to the various aspects of hand hygiene. 50% of the nurses in the public hospital had not received any hand hygiene training in the past three years. Less than 30% of the public-sector nurses knew that unclean hands were the main route of cross-transmission, more than 50% of the respondents were not aware of the primary source of germs and the correct time duration for the use of handrub. 79% nurses in the private hospital had no idea that handrubbing is more effective against germs than handwashing. *Conclusion:* Implementation of need-based education and training programmes, along with other elements of WHO's 'multimodal strategy' is required to improve the knowledge and change the behavior of nurses.

Keywords: nosocomial infections, hand hygiene, knowledge, gaps, education

1. Introduction

Hand hygiene has been recognized as one of the most simple and cost effective ways to reduce the incidence of health care associated infections (HCAIs)¹⁻³. In spite of being a relatively uncomplicated procedure about 40 percent of the health care workers do not comply with the established protocols for hand hygiene⁴⁻⁶. The importance of hand hygiene was established as early as the middle of the nineteenth century by pioneers like Ignaz F. Semmelweis and Florence Nightingale⁷.

The prevalence of HCAIs in developing countries is as high as 15.5 percent and about 7 percent in high-income countries⁸. HCAIs lead to increased mortality and morbidity, prolonged hospital stay, additional pain and suffering, increased cost of treatment, resistance to antimicrobials, and an additional burden on an already strained healthcare system⁹. Baker et al have suggested that 37 percent of HCAI are preventable¹⁰ and the United Kingdom Department of Health reported that 10 percent of HCAIs are directly related to non-compliance or low compliance with hand hygiene guidelines¹¹.

Performing proper hand hygiene is the easiest and most effective way to reduce HCAIs¹² and according to Stone et al. it involves the appropriate use and accessibility of alcohol rubs and soap¹³.

Nurses are the most numerous among different categories of health care workers¹⁴ and they play a central role in any healthcare system¹⁵. The four main tenets of nursing recognized all over the world "to promote health, to prevent illness, restore health and alleviate suffering" emphasize the importance of a nurse's job¹⁶. Nurses spend maximum time with the patients and nature of their work is such that they

have the highest number of opportunities to transmit infection from one patient to another. Therefore, it becomes imperative for the nurses to perform correct hand hygiene and prevent HCAIs.

It is important to educate health care workers about hand hygiene and its benefits but it is equally important to identify and explore the reasons why hand hygiene is not followed¹². Non-compliance may be due to a variety of reasons, including: lack of appropriate facilities for hand washing, high staff-to-patient ratios, insufficient knowledge and attitudes of the staff, and allergies to hand washing products¹⁷. A plethora of interventions have been suggested to improve compliance, they include both, single and multimodal interventions - increase in the availability of spaces where hand hygiene can be performed¹⁸, staff education and training, prompts and reminders, monitoring and feedback, cultural change and patient engagement.

2. Material and Methods

Study Design: A descriptive, cross-sectional survey design was implemented in which data was collected by means of a self-administered questionnaire (The World Health Organization's 'Hand Hygiene Knowledge Questionnaire for Health Care Workers')

Setting: This study was conducted at a government and private, super-specialty healthcare facilities with more than 150 beds.

Inclusion criteria: Individuals were eligible to participate if they fulfilled the following inclusion criteria: i) worked as a registered nurse/ student nurse; ii) Provided direct patient care; and iii) were willing to participate in the study and complete the questionnaire.

Sample Size: 100-registered/ student nurses were administered the questionnaires at all the approved clinical areas of the hospital and also at nurse's duty room and canteen.

Data analysis procedure: Data was analyzed using Statistical package for social sciences (SPSS) software. Data analysis procedure included basic descriptive statistics, and Pearson chi-Square Test. Basic descriptive statistics summarized the characteristics of the sample; Chi-square comparisons were performed to compare participants' knowledge of hand hygiene in the two hospitals.

3. Results

Table 1 about here ?

Majority of the respondents were females; there was no significant ($p=0.079$) variation in the gender of the respondents between the two facilities. Majority (88%) of the respondents in the government hospital were registered nurses and a small number (12%) of them were student nurses, however, all the respondents in the private facility were registered nurses. Almost half (46%) the respondents in the government facility were either working in the department of surgery or the outpatient clinic, whereas, 50% of the respondents in the private hospital were employed in the Intensive Care Unit [table 1].

Table 2 about here?

Majority (97.9%) of the respondents in the private facility had received hand hygiene training in the past three years. Highly significant knowledge variations were found concerning the main route of cross transmission (28% and 77%) and the most frequent source of germs (4% and 39%). Knowledge about the most appropriate time duration to perform hand rubbing was found to be significantly low among public-sector nurses [table 2].

Table 3 about here?

There is significant variation in knowledge, concerning the correlation of performance of hand hygiene after a body fluid exposure (100% and 83%) and exposure to patients' immediate surroundings (0% and 18%) with the prevention of germ-transmission.

Table 4 about here?

As is evident from table 4, knowledge about the various hand hygiene actions for the prevention of germ-transmission to the healthcare workers was not found to be significantly different in either of the study groups.

Table 5 about here?

Table 5 shows highly significant difference in the knowledge about the effectiveness of hand rubs and hand washing against the germs; about half of the corporate hospital nurses and only 5% of the public hospital nurses considered handrubbing to be less effective.

Table 6 about here?

Differences were highly significant concerning the correct hand hygiene method to be used in certain situations, such as: palpation of the abdomen (20% and 62%), before giving an injection (10% and 55%) and after removal of

examination gloves (10% and 44%) among the study groups [Table 6].

Table 7 about here?

Significant differences were found in the knowledge about the avoidance of certain germ-colonizing acts, like: wearing jewellery (100% and 88%); damaged skin (100% and 75%) and artificial fingernails (100 and 91%) among the respondents of the government and corporate hospital.

4. Discussion

It will be a folly to underemphasize the role of hand hygiene in the prevention of HCAI¹⁹. Hand hygiene promotion is a complex issue, it is influenced by a number of factors such as: knowledge; awareness of personal and group performance; work-burden; and type, tolerance and accessibility of hand hygiene agents²⁰.

Dearth of administrative support could be the reason why 50% of the nurses in the public hospital had not received any training in the field of hand hygiene in the last three years. Research shows that hand hygiene compliance is significantly higher in hospitals where management commitment and administrative support is forthcoming¹⁹.

Highly significant differences were found in the knowledge of nurses between the public and private facilities concerning the main route of transmission and the major source of germs, emphasizing the need for training among public sector nurses and improvement in the quality of training in the private hospital.

Performance of hand hygiene after touching any surface in the patient-zone and before contact with any surface in the health-care zone but without touching the patient²¹, cannot be an action that prevents the transmission of germs to the patient. This knowledge was significantly low among the respondents of the private hospital and could be attributed to poor awareness of the indications for hand hygiene and WHO's "my five moments for hand hygiene".

Nurses in the private hospital had significantly less knowledge of the fact that handrubs are more effective against germs, which is well corroborated by scientific literature¹⁹. Most of the nurses, in both the facilities, had a misconception that handrubbing caused more skin dryness, which is not true because the major cause of occupational hand dermatitis is handwashing with soap and water²².

Use of alcohol-based handrub is the preferred method for routine decontamination, especially in situations (like contact with intact skin, before insertion of invasive devices, after contact with inanimate objects) where hands are not visibly soiled²³, but this knowledge was significantly low among nurses of the government hospital.

Regular use of hand cream is essential for keeping the skin hydrated but these moisturizing agents are not usually sterile and can get contaminated²¹. This knowledge was found to be significantly less among the nursing personnel of the private facility.

5. Conclusion

This study highlights the need for a carefully planned educational programme, which provides accurate facts and disseminates hand hygiene guidelines²¹. Training programmes should be customized, keeping in mind the needs and skills of the target audience to facilitate learning. Follow-up programmes should also be introduced to constantly update the knowledge. However, education or training alone cannot ensure long-term behavior improvement and therefore WHO'S multimodal strategy²¹ can be employed in both the corporate and public hospitals.

6. Acknowledgement

I would like to thank Dr. Malini R. Capoor for patiently guiding me through this study. I would also like to thank Dr. H.P. Singh, Mrs. Paramjit Kaur, Mr. Dayanadha, Ms Navneet and Mr. Gurinder for their invaluable support.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

References

- [1] Boyce J. Update on hand hygiene. *Am J Infect Control* 2013, 41:594–596.
- [2] Squires J, Suh K, Liklater S, Bruce N, Gartke K, Graham I, Karovitch A, Read J, Roth V, Stockton K, Tibbo E, Woodhall K, Worthington J, Grimshaw J: Improving physician hand hygiene compliance using behavioural theories: a study protocol. *Implement Sci* 2013, 8:16.
- [3] Pfoh E, Sydney D. Interventions to improve hand hygiene compliance: brief update review. In *Making Health Care Safer 11: An Updated Critical Analysis of the Evidence for Patient Safety Practices*. Edited by Shekelle PG, Wachter RM, Pronovost PJ. Rockville, MD: Evidence Report/Technology Assessment Number 211, Agency for Healthcare Research and Quality; 2013.
- [4] Longtin Y, Sax H, Allegranzi B, Schneider F, Pittet D. "Videos in clinical medicine. Hand hygiene". *The New England Journal of Medicine*, vol. 364, article e24, 2011.
- [5] Tibballs J. Teaching hospital medical staff to hand wash. *Medical Journal of Australia*. 1996; 164(7): 395–398.
- [6] Pittet D, Hugonnet S, Harbarth S, et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *The Lancet*. 2000; 356 (9238): 1307–1312.
- [7] Pittet, D. Infection control and quality health care in the new millennium. *American Journal of Infection Control*. 2005; 33(5): 258-67. doi: 10.1016/j.ajic.2004.11.004
- [8] Allegranzi, B, Gayet-Ageron A, Damani N, Bengaly L, McLaws ML, Moro ML,...Pittet, D. Global implementation of WHO'S multimodal strategy for improvement of hand hygiene: a quasi-experimental study. *The Lancet: Infectious Diseases*, 2013; 13(10): 843-851. doi: 10.1016/S1473-3099(13)70163-4
- [9] World Health Organisation (WHO): Report on the Burden of Endemic Health Care-Associated Infection Worldwide. Geneva: WHO; 2011.
- [10] Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox, J...Tamblyn R. The Canadian adverse events study: Incidence of adverse events among hospital patients in Canada. *Canadian Medical Association Journal*. 2004; 170(10): 1678-1686. doi:10.1053/cmaj.1040498
- [11] Rickard NA. Hand hygiene: Promoting compliance among nurses and health workers. *British Journal of Nursing*. 2004; 13: 404-410.
- [12] Song X, Stockwell D, Floyd T, Short BL, Singh N. Improving hand hygiene compliance in health care workers: Strategies and impact on patient outcomes. *American Journal of Infection Control*. 2013; 41(10): 101-105. doi: 10.1016/j.ajic.2013.01.031
- [13] Stone PS, Fuller C, Savage J, Cookson B, Hayward A, Cooper B,...Charlette, A. Evaluation of the national Cleanyourhands campaign to reduce Staphylococcus aureus bacteraemia and Clostridium difficile infection in hospitals in England and Wales by improved hand hygiene: four year, prospective, ecological, interrupted time series study. *British Medical Journal*. 2012; 344, e3005. doi: 10.1136/bmj.e3005
- [14] Buerhaus PI, Auerbach DI, Staiger DO. Recent trends in the registered nurse labor market in the U.S.: short-run swings on top of long-term trends. *Nursing Economics*. 2007; 25(2): 59–66.
- [15] Abualrub RF. Nursing shortage in Jordan: what is the solution? *Journal of Professional Nursing*. 2007; 23(2): 117–120.
- [16] International Council of Nurses (2012). The ICN Code of Ethics for Nurses. Geneva: International Council of Nurses. Retrieved from: http://www.icn.ch/images/stories/documents/about/icn_ode_english.pdf
- [17] Shinde MB, Mohite VR. A study to assess knowledge, attitude and practices of five moments of hand hygiene among nursing staff and students at a tertiary care hospital at Karad. *International Journal of Science and Research*. 2014;3(2):311-321.
- [18] Chen YC, Sheng WH, Wang JT, Chang SC, Lin HC, Tien KL,... Tsai KS. Effectiveness and limitations of hand hygiene promotion on decreasing healthcare-associated infections. *PLoS One*. 2011;6(11). doi: 10.1371/journal.pone.0027163
- [19] Jumaa PA. Hand hygiene: simple and complex. *International Journal of Infectious Diseases*. 2005; 9: 3-14.
- [20] Pittet D, Simon A, Hugonnet S, Pessoa-Silva CL, Sauvan V, Pemeger TV. Hand hygiene among physicians: performance, beliefs and perceptions. *Annals of Internal Medicine*. 2004; 141(1): 1-8.
- [21] WHO Guidelines for Hand Hygiene in Health Care (Advanced Draft). Geneva, World Health Organization, 2006.
- [22] Kampf G, Löffler H. Prevention of irritant contact dermatitis among healthcare workers by using evidence-

based hand hygiene practices: a review. *Industrial Health*. 2007; 45: 645-652.

for hospital care. *Current Opinion in Infectious Diseases*. 2003; 16: 327-335.

[23] Pittet D. Hand hygiene: improved standards and practice

Table 1 Shows the Demographic characteristics of Nurses that participated in the study
 Total 100 nurses participated in the study

Demographics		Govt. Hospital (%)	Pvt. Hospital (%)	p-value
Gender	Male	0	6	0.079*
	Female	100	94	
Profession	Registered nurse	88.05	100	0.012*
	Nursing student	12.0	0	
Department	Internal medicine	14	2	0.001**
	Surgery	26	2	
	ICU	6	50	
	Mixed (medical/surgical)	8	18	
	Emergency	0	8	
	Obstetrics	2	0	
	Pediatrics	0	2	
	OPD	20	4	
	Others	24	14	

*Not Significant, **p<0.05 (Significant)

Table 2: Distribution of responses according to various aspects of hand hygiene knowledge

Question	Response	Govt. Hospital %	Pvt. Hospital %	p-value
Did you receive formal training in hand hygiene in the last three years?	No	50.0	2.1	<0.001***
Do you routinely use alcohol-based handrub for hand hygiene?	Yes	100.0	100.0	-
Which is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility?	Healthcare-workers' hands when not clean	28.0	77.1	<0.001***
What is the most frequent source of germs responsible for healthcare-associated infections?	Germs present on or within the patient	4.0	38.8	<0.001***
What is the minimum time needed for alcohol-based handrub to kill most germs on your hands?	20 seconds	16.7	47.9	<0.001***

p<0.05 (Significant); *p<0.001 (Highly significant)

Table 3. Which of the following hand hygiene actions prevent transmission of germs to the patient?

Hand hygiene actions	Govt. Hospital	Pvt. Hospital	p-value
Before touching the patient (yes)	50 (100%)	48 (96%)	0.153*
Immediately after a risk of body fluid exposure (yes)	31 (100%)	35 (83.3%)	0.017**
After exposure to the immediate surroundings of the patient (no)	0 (0%)	8 (18.6%)	0.011**
Immediately before a clean or aseptic procedure (yes)	31 (100%)	41 (91.1%)	0.088*

*Not Significant, **p<0.05 (Significant)

Table 4: Which of the following hand hygiene actions prevent transmission of germs to the HCWs?

Hand hygiene actions	Govt. Hospital	Pvt. Hospital	p-value
After touching a patient (yes)	50 (100%)	45 (100%)	-
Immediately after a risk of body fluid exposure (yes)	31 (100%)	40 (95.2%)	0.218*
Immediately before a clean or aseptic procedure (no)	0 (0%)	4 (9.8%)	0.074*
After exposure to patient's immediate surroundings (yes)	31 (96.8%)	34 (85%)	0.099*

*Not significant

Table 5. Distribution of responses according to the veracity of statements about alcohol-based handrub and handwashing

Statements	Govt. Hospital	Pvt. Hospital	p-value
Handrubbing is more rapid than hand washing (true)	33 (100%)	43 (97.7%)	0.383***
Hand rubbing causes more skin dryness than handwashing (false)	7 (22.6%)	9 (20.5%)	0.825***
Handrubbing is more effective against germs than handwashing (true)	41 (95.3%)	26 (56.5%)	<0.001**
Handwashing and handrubbing should be performed in a sequence (false)	7 (20%)	11 (26.8%)	0.453***

*Not significant; *** p<0.001(Highly significant)

Table 6: Distribution of the responses according to the most accurate hand hygiene methods required in a particular situation

Situation	Govt. Hospital	Pvt. Hospital	p-value
Before palpation of the abdomen (rubbing)	10 (20%)	31 (62%)	<0.001***

Before giving an injection (<i>rubbing</i>)	5 (10%)	27 (55.1%)	<0.001***
After emptying a bedpan (<i>washing</i>)	36 (72%)	41 (82%)	0.097*
After removing examination gloves (<i>rubbing/washing</i>)	5 (10%)	22 (44%)	<0.001***
After making a patient's bed (<i>rubbing</i>)	6 (12%)	13 (26%)	0.074*
After visible exposure to blood (<i>washing</i>)	42 (84%)	38 (76%)	0.356*

*Not significant; ***p<0.001 (Highly significant)

Table 7: Distribution of the responses according to the actions which should be prevented to decrease germ-colonization on hands

<i>Actions to be avoided</i>	<i>Govt. Hospital</i>	<i>Pvt. Hospital</i>	<i>p-value</i>
Wearing jewellery (<i>yes</i>)	43 (100%)	44 (88%)	0.019**
Damaged skin (<i>yes</i>)	34 (100%)	33 (75%)	0.002**
Artificial fingernails (<i>yes</i>)	43 (100%)	41 (91.1%)	0.045**
Regular use of a handcream (<i>no</i>)	24 (75%)	15 (34.9%)	0.001**

**p<0.05 (Significant)

