

Hand Washing Practice among Health Care Workers in a Teaching Hospital

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ABSTRACT

Background: Health care associated infection has been identified as one of the major challenges of modern medicine and remains as a major health concern around the globe. Hands of the health-care workers are potential vehicle for transmission of pathogenic organisms within the healthcare environment. Hand washing is widely accepted as one of the most effective measures in prevention of health care associated infections.

Methods: A descriptive cross-sectional study was conducted to assess the hand washing practice among the doctors, intern doctors, nurses, medical students and nursing students in a multi specialty, non government tertiary care teaching hospital in Kathmandu. Summary statistics and chi-square tests were performed and the type I error was set at 0.05 for analysis.

Results: Out of the total 336 participants of the study, there was significant difference in hand washing practice among the participants ($P < 0.001$). Hand washing practice both before and after the patient examination was found to be highest among the nursing students followed by the nurses. The frequency of hand washing after exposure to hospital instruments, blood or other body fluids among the participants was remarkably high (more than 90%) in all groups. Nearly 99% of the participants agreed upon the fact that hand washing could be an effective measure in preventing health care associated infections.

Conclusions: The healthcare workers understand the importance of hand washing but tend to wash their hands selectively depending upon the indications. The majority of the health care workers wash their hands after the patient care than before.

Keywords: hand washing; healthcare workers; hospital infection; Nepal.

INTRODUCTION

Hospital acquired infection can be defined as infection acquired during the hospital stay or the period following the hospital stay but not present or incubating at the time of admission and is one of the major health problems encountered in health care settings.^{1,2}

The hands of the health care workers play a major role in transmission of the healthcare-associated pathogens from one patient to another.^{3,4} The most common organisms resulting in hospital acquired infections are *Escherichia coli*, *Methicillin Resistant Staphylococcus*

Aureus (MRSA), *Enterococci*, *Pseudomonas aeruginosa*, *Salmonella*, *Streptococcus*, *Staphylococcus*, *Candida*, *Clostridium difficile* etc.^{5,6}

Hand hygiene is a key component of good hygiene practice at the hospital and can produce significant benefits in terms of reducing different infections.⁷ Hand washing and chemical disinfection of hands have been widely accepted as a universal precautionary measure in preventing and limiting the spread of health care associated infections.⁸⁻¹⁰ Proper drying of washed hands

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is also an integral part of hand hygiene as wet hands can acquire and spread microorganisms.¹¹

METHODS

A descriptive cross sectional study was conducted at Kathmandu Medical College Teaching Hospital from June 2011 to September 2011. A total of 336 samples were selected by quota sampling technique. Structured questionnaire was prepared using "The World Health Organization (WHO) Hand Hygiene Knowledge Questionnaire for Health-care Workers". The questionnaire was pre-tested among 20 medical personnel prior to the study at Kathmandu Medical College Teaching Hospital who were later not the part of the actual study.

The participants of the study comprised of doctors (residents, house officers and intern doctors), nurses, medical students and nursing students. Participation in the research was voluntary. Informed consent was obtained from each participant. The questionnaire was self administered anonymously by the participants who consented for participation in the study. Ethical approval for the study was obtained from Nepal Health Research Council (NHRC) Ethical Review Board on 3rd June 2011.

The data obtained were entered in Microsoft Excel 2007 and analyzed in Statistical Package for Social Sciences (SPSS) version 16.0. Summary statistics and chi-square tests were done and the type I error was set at 0.05 for analysis.

RESULTS

The overall response rate of the study was 100% from 336 participants. Total 122 (36%) were male and 214 (64%) were female participants. The median age of

the participants was 23 years (range 18-56 years). The highest number of participants were the medical students 100 (29.8%) followed by interns 71 (21.1%), doctors 60 (17.9%), nurses 56 (16.7%) and nursing students 49 (14.6%).

Three hundred thirty participants (98.5%) in the study agreed that hand washing could be an effective measure in preventing health care associated infection. However, only 294 participants (87.5%) used the hand hygiene products available to them. (Table 1), below shows the availability of different hand hygiene products to the study participants at the hospital. Around 12 participants (3.6%) informed that they had only water or nothing for washing their hands.

Table 1. Types of hand hygiene products available to the participants.

Hand hygiene products	Frequency (%)
Soap bar	173 (51.5)
Liquid hand wash	74 (22)
More than one product*	33 (9.8)
Only water	30 (8.9)
Alcohol based hand sanitizer	14 (4.2)
Nothing	12 (3.6)
Total	336 (100)

*More than one product includes: Two or more of the hand hygiene products like Soap bar, Liquid hand wash, Alcohol based hand sanitizer

(Table 2) revealed that there was significant difference in hand washing practice among the participants (P-value <0.001). It was found to be highest among the nursing students followed by the nurses. We could not obtain any conclusion on "hand washing practice only before the examination" due to few numbers of cases.

Table 2. Hand washing practice among the participants during patient examination.

Designation/ Response	Doctor n (%)	Nurse n (%)	Intern doctor n (%)	Medical student n (%)	Nursing student n (%)	P value (x2)
Both before and after examination	22 (36.7)	43 (76.8)	22 (31)	26 (26)	38 (77.6)	<00.01
Only before the examination	1 (1.7)	2 (3.6)	-	0 (0)	2 (4.1)	NA*
Only after the examination	21 (35)	6 (2.7)	28 (39.4)	35 (35)	6 (12.2)	<00.01
Don't wash at all	16 (26.7)	5 (8.9)	21 (29.6)	39 (39)	3 (6.1)	<00.01

*Not applicable

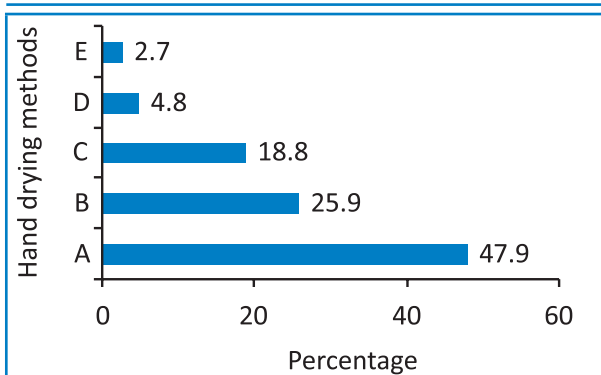
Table 3. Hand washing practice among the participants after exposure to hospital instruments, blood or other body fluids.

Response	Doctor n (%)	Nurse n (%)	Intern doctor n (%)	Medical student n (%)	Nursing student n (%)	P value (x2)
Yes immediately after the exposure	59 (98.3)	55 (98.2)	71 (100)	91 (91)	49(100)	0.004
No	1 (1.7)	1 (1.8)	0 (0)	9 (9)	0 (0)	

Table 4. Hand washing practice among the participants after blowing nose, sneezing or coughing into the hands.

Response	Doctor n (%)	Nurse n (%)	Intern doctor n (%)	Medical student n (%)	Nursing student n (%)	P value (x2)
Yes immediately after the exposure	42 (70)	51 (91.1)	52 (73.2)	61 (61)	46 (93.9)	<00.01
No	18 (30)	5 (8.9)	19 (26.8)	39 (39)	3 (6.1)	

The frequency of hand washing after exposure to hospitals instruments, blood or other body fluids among the participants, and that was remarkably high (more than 90%) among all professionals and students (Table 3). Similarly, hand washing practice after blowing nose, sneezing or coughing into the hands was higher in nursing students and nurses (more than 90%) (Table 4).

**Figure 1. Hand drying methods among the participants.**

A-Towel provided at the workplace, B-Personal towel, C- Atmospheric air dry, D-Single use disposable towel, E- Hand drier

The hand drying practice among the participants is displayed in (Figure 1). Nearly half of respondents used towel provided at the workplace followed by personal towel used by 87 (25.9%) participants.

Regarding the appropriate measures to increase the compliance of hand washing practice in the hospital, out of the total 336 participants, 159 (47.3%) reported that “appropriate placement and easy accessibility of soap dispensers and hand washing stations” could be the most important factor influencing the health care workers’ compliance towards hand hygiene followed by the importance of formal training on hand washing and

hygiene 149 (44.3%) and provision of liquid hand wash instead of soap bars 120 (35.7%).

DISCUSSION

We found that although 330 participants (98.5%) agreed that hand washing could be an effective measure in preventing health care associated infections, only 294 participants (87.5%) used the hand hygiene products available to them. Among the different hand hygiene products like soap bar, liquid hand wash, only water, alcohol based hand rub; soap bar was available to the majority of the participants that is 173 (51.5%) followed by liquid hand wash available to 74 participants (22%), while alcohol based hand sanitizer to only 14 participants (4.2%). In a microbiological study done at a hospital in Ohio, USA by McBride¹² to compare the bacterial load in two in-use bar soaps with and without antibacterial and two liquid soaps, out of the 25 samples taken from each soap, 92 to 96% of samples from bar soaps were culture positive as compared to 8% of those from liquid soaps; the difference in bacterial population between bar soaps and liquid soaps being statistically significant ($P = 0.005$). In the same study, *Staphylococcus aureus* was isolated on three occasions from bar soaps but twice from the exterior of the plastic dispensers of liquid soap but not from the soap itself. PP Hegde et al¹³ in Belgaum, India concluded that 100% of the 32 samples obtained from the bar soap yielded positive culture and the microbial load of the “in-use” bar soap constituted a mixed flora of gram positive, gram negative, aerobes, anaerobes, and fungi. In our study we found that soap bar was available to the majority of the participants but liquid hand wash was available to only 74 participants (22%) which is a matter of great concern as “in-use” bar soap is a reservoir of several microorganisms and hand washing with such soaps may lead to spread of wide range of gastrointestinal, respiratory, skin and other infections.

Several studies have reported increased compliance of hand hygiene with the introduction of alcohol based hand sanitizers in health care settings especially in high demand situations and in crowded areas of hospitals like the Out Patient Departments (OPDs).^{14,15} Though there has been widespread use of alcohol-based hand sanitizers as an alternative to, or in conjunction with hand washing in most of the hospitals in Europe and America, our study reveals only a small number (4.2%) of the participants with access to hand sanitizers.

There was significant difference in hand washing practice among the participants ($P < 0.001$). The hand washing practice "both before and after the patient examination" was found to be highest among the nursing students followed by the nurses while lowest among the medical students ($P < 0.001$). There were some participants who washed hands only before or only after the examination among which the number of participants washing hands only after examination was high. However, we could not obtain any conclusion on "hand washing practice only before the examination" due to few numbers of cases. The difference in hand washing practice among different groups of medical personnel could be due to differences in work load, accessibility to soap dispensers and hand washing stations, irritation and dryness of the hands by the chemical irritants and the level of awareness regarding hand hygiene. In a study done at the Emergency department in a tertiary referral, private teaching hospital in Indiana, it was found that nurses washed their hands significantly more often than either staff physicians or resident physicians which is consistent with our study.¹⁶ In another study, a multivariate analysis done by Pittet et al at a teaching hospital in Geneva in Switzerland, non compliance for hand washing was higher among physicians and other health care workers than among the nurses which is also consistent with our study.¹⁷

We studied the hand washing practice after exposure to hospital instruments, blood or other body fluids and also after blowing nose, sneezing or coughing into the hands among the participants. We found that the hand washing frequency after exposure to hospital instruments, blood or other body fluids was remarkably high (more than 90%) in all groups as compared to the hand washing practice during patient examination. Regarding the hand washing after blowing nose, sneezing or coughing into the hands, the hand washing frequency was more than 60% in all groups indicating an increment in hand washing practice all groups of participants except for the nurses and nursing students as compared to practice during patient examination. However, the practice is still less than hand washing practice after exposure to hospital instruments, blood or other body fluids. This indicates that though

the healthcare workers understand the importance of hand washing, they tend to wash their hands selectively depending upon the indications.

Regarding the method of hand drying among the participants, 47.9% ($n=161$) used the common towel provided at their workplace; followed by the use of the personal towel by 25.9% ($n=87$), hand drier was used by only 2.7% ($n=9$) of the participants. Use of common towel in health care settings is not recommended due to the risk of recontamination by repeated use and wetting of the towel. In a study done by Ansari et al, it was found that irrespective of the hand-washing agent used, electric air drying produced the highest and cloth drying the lowest reduction in the numbers of the test micro-organisms; indicating the importance of selecting the right means for drying washed hands.¹⁸

There are several limitations of our study. This study reflects the hand washing practice among the health care workers and the allied at a single non government tertiary care teaching hospital. Hence, the results of the study cannot be generalized for other hospitals. The questionnaire used for the research was self reported by the participants of the study and there could be bias due to that. This study lacks to address the reason behind the poor compliance of the hand washing practice among the doctors and the medical students and also lacks to address the significant differences found in hand washing practice among the health care workers. In order to find out these, we recommend further multi-centric studies to address these areas.

CONCLUSIONS

Hand washing is the most important measure in preventing health care associated infections and should therefore, be the top priority of all health care workers. The hand-hygiene compliance does not rely on individual factors alone. The reasons for non-compliance should be identified through appropriate research in order to achieve a full recognition of the importance of hand washing among healthcare workers. The health care institutions as well as the hospital infection control committee have a major role to play in order to make sure that the health care workers follow the standard hand washing hygiene practice during patient care. The practice and compliance of hand hygiene can be improved by multidisciplinary and multimodality approaches like easy accessibility to soap dispensers and hand washing stations, training on hand washing and hygiene replacement of soap bars with less time consuming alcohol based hand sanitizers with good skin tolerance especially in high work load areas of the hospital, using posters depicting hand hygiene instructions, and senior health workers playing role models for junior colleagues.

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