A Study on Knowledge, Attitudes and Practices on Hand Hygiene amongst Residents and Nursing Staff at Tertiary Care Hospital, Drug Chhattisgarh, India

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ABSTRACT

Knowledge of hand hygiene as the single most important precautionary measure to reduce nosocomial and healthcare associated infections. We carried out a study to assess the knowledge, attitudes, practices and satisfaction of facilities available to health care workers amongst residents and nurses in our institute. A cross-sectional, paper-questionnaire was administered to explore the knowledge of, and attitudes towards, hand hygiene practices. Data analysis were done in Microsoft Excel sheet and presented as numbers and percentages. Appropriate statistical tests were applied as and when required. p-value less than 0.05 were considered significant. A total 190 respondents were studied about their knowledge and attitude towards hand hygiene practices. Our study showed that respondents from both groups (95 each) had average knowledge regarding WHO steps of hand washing (55% and 58% respectively), residents has better knowledge than nurses regarding hand rubbing is more effective against germs than hand washing (44.21% and 15.78%). The attitude regarding correct hand hygiene practices to be followed at all times was found to be better among nurses (78.94%) as compared to residents (35.78%) which was found to be highly significant with p-value <0.001. Hand hygiene knowledge attitudes and practices among nurses and residents were moderate to poor. The present study underscores the need for further improvement in the existing training programs to address the gaps in hand hygiene.

Keywords
Hand hygiene, Healthcare associated infections, Nosocomial infections, Hand hygiene practices, Knowledge, Attitude

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Introduction

Health care-associated infections are a serious problem in health care services as they may cause prolonged hospital stays, high mortality, long-term disability, and excess health care costs. Most health care-associated infections can be transmitted from patient to patient via the hands of health care workers. In other words, health care workers’ hands due to poor hand hygiene are the most usual type of vehicle for the transmission of health care-associated infections (Allegranzi et al., 2011).

Hand hygiene is an important healthcare issue globally and is a single most cost-effective and practical measure to reduce the incidence of healthcare-associated infection and the spread of antimicrobial resistance across all settings—from advanced health care systems...
to primary healthcare centers, these infections are the most common adverse events resulting from a stay in the hospital affecting approximately 5 to 10% of hospitalized patients in the developed world, and the burden is larger in underdeveloped nations. In spite of being a very simple action, compliance with hand hygiene among health care providers is as low as less than 40%. To address this problem of lack of compliance with hand hygiene, continuous efforts are being made to identify effective and sustainable strategies (Azzam al Kadi et al., 2012). It has been proved that training sessions on hand hygiene has resulted in sustained improvement (Gould et al., 2008).

Thus, handwashing is emphasised as the single most important measure to prevent cross transmission of micro-organisms and thus to prevent nosocomial infections (Conly et al., 1989).

This study is planned to primarily determine the awareness amongst Health Care Providers of Tertiary care hospital & to assess their knowledge regarding hand hygiene.

Materials and Methods

The present study was carried out in the Department of Microbiology, Shri Shankaracharya institute of medical sciences, during a time period of 3 months. Participants were supposed to filled a questionnaire which helped us to test their social hand washing knowledge, practices and awareness. It was prepared by using WHO questionaries. (3) This proforma of 39 questions includes multiple choice and “yes” or “no” questions. Attitude and practice were assessed using another self-structured questionnaire which consists of 13 questions where the subjects had to give their opinion on a 1 to 5 point scale ranging from strongly disagrees to strongly agree.

For scoring, 1 point was given for each correct response to good level of knowledge and positive attitude and 0 point was given for poor level of knowledge and negative attitude, 75% and above was considered good, a score between 50-74% was moderate/ average/ fair and below 50% was considered poor. A P value less than 0.05 were considered significant.

Study Population: Health Care Providers of Rims Hospital, Raipur

Inclusion Criteria: All Health Care Providers (HCP) consenting for study.

Exclusion Criteria: All Health Care Providers (HCP) not consenting for study.

Study Type: Cross sectional study.

Sample Size: Non-Repetitive (95 residents and 95 nursing staff) samples in form of questionnaires from Health Care Providers (HCP) of SSIMS hospital, Drug.

Study Time: 3 months.

Procedure for sampling

Health Care Providers will be divided into 2 groups –

Group II (95 Participants): Junior & Senior Residents
Group III (95 Participants): Nursing Staff

After Informed Consent, questionnaires will be given to Health Care Providers (HCP) of SSIMS hospital,

Planned procedure to analyze data

All data was maintained in Microsoft office Excel. All statistical analysis will be carried out using Excel and Appropriate Statistical
tools will be applied wherever required like tests of proportion.

**Ethical considerations**

Informed Written Consent will be taken from the patient before doing the required investigations. Ethical clearance will be obtained from RAC and Institutional Ethical Committee (IEC).

**Results and Discussion**

A total of 190 candidates were studied. Out of which 95 were residents and 95 were nursing staff. They were recruited using standard questions. The level of knowledge about hand hygiene was moderate among the total study population.

No significant difference was observed in study group regarding knowledge about routes of transmission of infection, about most appropriate timing for performing hand hygiene actions that prevent transmission of germs to the patient and to the health care worker.

Significant difference of 50(52.63%) and 33 (34.73%) were observed regarding most frequent source of germs responsible for health care associated infections and Significant knowledge difference of 42(44.21%) and 15(15.78%) were observed regarding effectiveness of alcoholic hand rubs being more effective against germs than hand washing in study groups among resident and nurses respectively (Table 1).

Regarding knowledge to decrease colonization, a significant difference was observed in use of artificial nails 75(78.94%) against 86(90.52%) amongst residents and nurses respectively (Table 1).

When the attitudes were assessed it was found that nurses had good attitudes as compared to residents like sufficient knowledge and training with respect to hand hygiene, feeling of guilt after omitting a hand hygiene by self and feeling of uncomfort when others omit hand hygiene as well as perception of the dirty areas of the hands (Table 2).

Although hand hygiene is a very simple procedure and has long been deemed one of the most important infection control measures, the compliance rates by health care workers are generally reported to be low (Yuan et al., 2009 and Allegranzi et al., 2011). The present study was conducted to assess the current situation of hand hygiene in our institute and to put forth recommendations to improve hand hygiene measures and thereby reduce the rate of cross transmission of infections.

In this study, both residents and nurses had average knowledge on hand hygiene. Nearly seventy five respondents answered correctly when asked about the main route of transmission of potentially harmful germs between patients.

Our results are comparable with other studies (Ariyaratne MHJD et al., 2013, Veena et al., 2014) which reported that 72% and 75% of participants knew that unhygienic hands of health care workers were the main route of transmission respectively.

In our study, knowledge that alcohol free hand rub is more rapid and more effective against germs than hand washing was better among residents.
Results and Discussion

|   | Which of the following is the main route of transmission of potentially harmful germs between patients (Health care workers hands when not clean) | Resident 95 | Nurses 95 | P value | significance |
|---|----------------------------------------------------------------------------------------------------------------------------------|------------|-----------|---------|---------------|
| 1 | Which of the following is the main route of transmission of potentially harmful germs between patients (Health care workers hands when not clean) | 74 (77.89%) | 75 (78.94%) | 0.86 | NS |
| 2 | What is the most frequent source of germs responsible for health care associated infections? (Germs already present on or within the patient) | 50 (52.63%) | 33 (34.73%) | 0.0129 | Significant |
| 3 | According to WHO how many steps of hand washing, do you know? (7) | 55 (57.89%) | 58 (61.05%) | 0.65 | NS |
| 4 | Do you think wearing gloves replaces the need for hand washing practices (N) | 82 (86.31%) | 80 (84.21%) | 0.68 | NS |

Which of the following hand hygiene actions prevents transmission of germs to the patient?

|   | Which of the following hand hygiene actions prevents transmission of germs to the patient? | Resident 95 | Nurses 95 | P value | significance |
|---|--------------------------------------------------------------------------------------------|------------|-----------|---------|---------------|
| 5 | Before touching a patient (yes) | 90 (94.73%) | 93 (97.89%) | 0.247 | NS |
| 6 | Immediately after risk of body fluid exposure (yes) | 75 (78.94%) | 82 (86.31%) | 0.180 | NS |
| 7 | After exposure to immediate surroundings of a patient (no) | 41 (43.15%) | 28 (29.47%) | 0.049 | Significant |
| 8 | Immediately before a clean / aseptic procedure (yes) | 77 (81.05%) | 82 (86.31%) | 0.326 | NS |

Which of the following hand hygiene actions prevents transmission of germs to the health care worker?

|   | Which of the following hand hygiene actions prevents transmission of germs to the health care worker? | Resident 95 | Nurses 95 | P value | significance |
|---|--------------------------------------------------------------------------------------------|------------|-----------|---------|---------------|
| 9 | After touching a patient (yes) | 79 (83.15%) | 94 (98.94%) | <0.001 | significant |
| 10 | Immediately after a risk of body fluid exposure (yes) | 91 (95.78%) | 90 (94.75%) | 0.73 | NS |
| 11 | Immediately before a clean / aseptic procedure (no) | 31 (32.63%) | 53 (55.78%) | 0.0013 | significant |
| 12 | After exposure to the immediate surroundings of a patient (yes) | 60 (63.15%) | 72 (75.78%) | 0.326 | NS |

Which of the following statements on alcohol-based hand rub and hand washing with soap and water is true?

|   | Which of the following statements on alcohol-based hand rub and hand washing with soap and water is true? | Resident 95 | Nurses 95 | P value | significance |
|---|---------------------------------------------------------------------------------------------------|------------|-----------|---------|---------------|
| 13 | Hand rubbing is more rapid for hand cleansing than hand washing (true) | 75 (78.94%) | 82 (86.31%) | 0.1801 | NS |
| 14 | Hand rubbing causes skin dryness more than hand washing (false) | 38 (40%) | 23 (24.21%) | 0.0198 | NS |
| 15 | Hand rubbing is more effective against germs than hand washing (false) | 42 (44.21%) | 15 (15.78%) | <0.001 | significant |
| 16 | Hand washing and hand rubbing are recommended to be performed in sequence (false) | 44 (46.31%) | 14 (14.73%) | 0.0005 | significant |
| 17 | What is the minimal time needed for alcohol based rub to kill most germs on your hands? (20 seconds) | 42 (44.21%) | 36 (37.89%) | NS | NS |
Which type of hand hygiene method is required in the following situations?

| Situation                                      | Resident 95 | Nurses 95 | P value | significance |
|------------------------------------------------|-------------|-----------|---------|--------------|
| Before palpation of the abdomen (rubbing)      | 40(42.10%)  | 58(61.02%) | 0.009   | significant  |
| Before giving an injection (rubbing)           | 36(37.89%)  | 42(44.21%) | 0.3762  | NS           |
| After emptying a bed pan (washing)             | 73(76.84%)  | 84(88.42%) | 0.0352  | significant  |
| After removing examination gloves (rubbing/washing) | 75(78.94%) | 86(91.52%) | 0.0265  | significant  |
| After making a patients bed (rubbing)          | 22(23.15%)  | 11(11.57%) | 0.0352  | significant  |
| After visible exposure to blood (washing)      | 46(48.42%)  | 62(65.26%) | 0.0191  | significant  |

Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?

| Reason                                      | Resident 95 | Nurses 95 | P value | significance |
|---------------------------------------------|-------------|-----------|---------|--------------|
| Wearing jewellery (yes)                     | 74(77.89%)  | 93(97.87%) | 0.2479  | NS           |
| Damaged skin (yes)                          | 91(95.78%)  | 89(93.68%) | 0.1801  | NS           |
| Artificial fingernails (yes)                | 75(78.94%)  | 86(90.50%) | 0.04    | significant  |
| Regular use of a hand cream (no)            | 54(56.84%)  | 73(76.84%) | 0.3263  | NS           |

What do you think are the reasons for poor hand washing compliance?

| Reason                                      | Resident 95 | Nurses 95 | P value | significance |
|---------------------------------------------|-------------|-----------|---------|--------------|
| Lack of knowledge of guidelines/ protocols  | 88(92.63%)  | 82(86.31%) | 0.1561  | NS           |
| Wearing gloves/ gowns                       | 23(24.21%)  | 26(27.36%) | 0.6188  | NS           |
| Understaffing and Overcrowding              | 62(65.26%)  | 67(70.52%) | 0.4372  | NS           |
| Poor access to hand washing facilities      | 77(81.05%)  | 75(78.94%) | 0.7168  | NS           |
| Non availability of alcohol based hand rubs | 84(88.42%)  | 86(90.52%) | 0.6364  | NS           |
| Non availability of soap and water          | 81(85.26%)  | 83(87.36%) | 0.6729  | NS           |
| Hand washing agents cause irritation and dryness | 47(49.47%) | 50(54.34%) | 0.6633  | NS           |

What is the best approach to improve hand washing compliance?

| Approach                                      | Resident 95 | Nurses 95 | P value | significance |
|-----------------------------------------------|-------------|-----------|---------|--------------|
| Motivation                                    | 81(85.26%)  | 89(93.68%) | <0.001  | significant  |
| Availability of alcohol based hand rubs       | 48(50.50%)  | 53(55.78%) | 0.716   | NS           |
| Training and education of HCW                 | 65(68.42%)  | 68(71.57%) | 0.026   | significant  |
| Need for automated soap dispensers            | 28(29.47%)  | 33(34.73%) | 0.012   | significant  |
| Instructions demonstrating correct hand washing techniques to be displayed | 65(68.42%)  | 54(56.84%) | 0.026   | significant  |
Table 1 Comparison of knowledge amongst resident and nursing student regarding various parameter of hand hygiene. Significance calculated using student T test. P< 0.05= significant value < 0.001 = highly significant, NS= non-significant

**Attitude**

|   | Resident 95 | Nurses 95 | P value | significance |
|---|-------------|-----------|---------|--------------|
| 1 | Correct hand hygiene practices should be followed at all times | 34(35.78%) | 75(78.94%) | <0.001 | significant |
| 2 | A health care personnel should have sufficient knowledge and training about hand hygiene | 36(37.89%) | 82(86.31%) | <0.001 | significant |
| 3 | I feel guilty when I omit hand hygiene | 38(40%) | 72(75.78%) | <0.001 | significant |
| 4 | I feel uncomfortable when others omit hand hygiene | 31(32.63%) | 68(71.57%) | <0.001 | significant |
| 5 | Sometime hand washing is not feasible in case of emergencies | 15(15.78%) | 13(13.68%) | 0.6823 | significant |
| 6 | A health care personnel should enrol in regular training sessions regarding hand hygiene practices | 36(37.89%) | 47(49.47%) | 0.1076 | NS |

What is your perception of the dirty areas of the hands?

|   | Resident 95 | Nurses 95 | P value | significance |
|---|-------------|-----------|---------|--------------|
| 8 | Palm | 80(84.21%) | 84(88.42%) | <0.001 | significant |
| 9 | Finger | 82(86.31%) | 78(82.10%) | 0.7716 | NS |
| 10 | Finger tips | 79(83.15%) | 75(78.94%) | 0.026 | significant |
| 11 | Dorsum of hand | 54(56.84%) | 59(62.10%) | 0.002 | significant |
| 12 | Nails | 70(73.68%) | 75(78.94%) | 0.020 | significant |
| 13 | Web spaces | 69(72.63%) | 72(75.78%) | 0.618 | NS |

However, only some of the residents and nurses (42% and 36% respectively) were aware about the minimum time needed for effective hand hygiene as mentioned in WHO guidelines.

However, only 50% of residents and 33% of nurses knew that the most frequent source of germs responsible for HCAI’s were the germs already present on or within the patient, residents having significantly better knowledge in this aspect. Our findings were similar to a study carried out by Veena et al., (2014) and Khaled et al., (2008). Wherein 23.2% of observed candidates showed inappropriate hand washing due to both short contact time (less than 30 sec) and improper drying after hand washing. Half of the health care worker (HCWs) was unaware of all of the steps of HW advocated by the WHO guideline. These findings were similar to a study conducted in 2015, which revealed that HCWs had knowledge deficits on one or more components of HH steps (Fernandez et al., 2015). These findings may be due to lack of education, regular in-service education, training regarding infection prevention, appropriate feedback, or lack of hospital protocol or policy on strict adherence to WHO recommended Hand hygiene guidelines. These findings indicate that health care worker needs more rigorous, comprehensive, and regular education and training on hand hygiene and infection prevention to the HCWs. A study conducted in India showed
that 85% HCWs considered hand rubbing with alcohol-based rubs to be more rapid and less time-consuming than hand wash with soap and water (Anargh et al., 2013) which is similar to our finding (82%).

Both groups had answered below satisfaction level regarding hand hygiene before giving an injection (41%), and after making a patients bed (17.36%). Comparative values given in study of MHID Ariyaratne in Srilanka et al., (2013) are 26% and 25% and in Veena et al., are, 27% and 21% respectively which is similar to present study.

Both the groups were aware of the type of hand hygiene method required after removing examination gloves (75% and 86%) and also after emptying a bed pan (73% and 84%) respectively and thus showed good knowledge in this respect.

A majority of the nurses (75%) agreed that correct hand hygiene practices should be followed at all times compared to (35.78%) residents.

More nurses felt guilty about omitting hand hygiene and also felt uncomfortable when others omit hand hygiene (72% and 68% respectively) as compared with residents. Furthermore, our results are comparable with other studies and reports. Corresponding values for MHID Ariyaratne in Sri Lanka are 69% and 39% and in study of Veena et al., are, 70% and 56% respectively. The present study shows that majority of the respondents had average knowledge, while approximately half of the respondents had good attitudes while majority had poor hand hygiene practices. Despite the fact that hand hygiene is considered as the single best measure for infection control.

Adherence to recommended hand hygiene practices by healthcare professionals is the most effective way to reduce healthcare-associated infections. In our study highlights the urgent need for introducing measures in order to increase the knowledge, attitudes, practices Teaching Hospital, which may play a very important role in increasing hand hygiene compliance among the staff and reducing cross transmission of infections among patients.

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