Assessment of Knowledge, Attitude and Practice of Healthcare Workers about Hand Hygiene

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Authors’ contributions

This work was carried out in collaboration among all authors. Author MA designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors AH and SMH managed the analyses of the study. Author FK managed the literature searched and Author SA compiled the literature reviews. All authors read and approved the final manuscript.

ABSTRACT

Aims: The purpose of this study was to assess the knowledge, attitude and practice of healthcare workers about hand hygiene.

Study Design: A cross sectional study was used.

Place and Duration of Study: Memon Medical Institute Hospital, a tertiary care private hospital Karachi, Pakistan from November 2021 to December 2021.

Methodology: Non-random convenience sampling method was used in this study.

Results: Most participants have an acceptable level of knowledge of hand hygiene. The highest scores were in the infection control domain and the lowest scores defined the hand hygiene.
Hand hygiene is the simplest yet effective way to stop the spread of germs/microbes. The practice of hand hygiene for HCWs has been recommended by the international public health agencies including the World Health Organization (WHO). However, compliance remains low presently [17, 18], hence the need for continuous surveillance.

2. METHODOLOGY

A cross sectional method was conducted among healthcare providers at Memon Medical Institute Hospital in 2021. The samples consisted of 209 healthcare workers. Sample size was calculated by Open Epi software. The HCWs were invited to participate in the study through a non-random convenient sampling method. Inclusion criteria included Healthcare workers who have minimum 1-year clinical experience, aged 20 to 50 years, doctors and nurses, midwives having valid PMDC or PNC License. Exclusion criteria consisted of non-clinical staff who were not willing to be part of study.

The research tool was WHO questionnaire named as “HAND HYGIENE KNOWLEDGE QUESTIONNAIRE”. The questionnaire consisted of two parts, the first part comprises of demographic data and the second part was based on 9 questions for HCWs regarding the knowledge of hand hygiene practice/procedures. In addition to questionnaire responses, demographic detail was collected including participant's educational institution, age, gender, and previous experience of working in the healthcare industry.

Data was analyzed using SPSS version 21. Data collection was conducted in November 2021 after the ethical approval by IRB of Memon Medical Institute Hospital.
### Table 1. Socio demographic characteristics of study participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>%</th>
</tr>
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<tbody>
<tr>
<td><strong>Age (years)</strong></td>
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<td></td>
</tr>
<tr>
<td>20-25</td>
<td>82</td>
<td>39.23</td>
</tr>
<tr>
<td>26-30</td>
<td>77</td>
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<td>20.57</td>
</tr>
<tr>
<td>36-40</td>
<td>6</td>
<td>2.87</td>
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<tr>
<td>41-45</td>
<td>1</td>
<td>0.47</td>
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<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>35.4</td>
</tr>
<tr>
<td>Female</td>
<td>135</td>
<td>64.6</td>
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<td><strong>Marital Status</strong></td>
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<tr>
<td>Unmarried</td>
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<tr>
<td>Divorced</td>
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<td><strong>Working Experience</strong></td>
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<td></td>
</tr>
<tr>
<td>1-year</td>
<td>32</td>
<td>15.31</td>
</tr>
<tr>
<td>less than 1 year</td>
<td>22</td>
<td>10.52</td>
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<td>more than 1 year</td>
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<td>74.16</td>
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<td><strong>Education</strong></td>
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<td></td>
</tr>
<tr>
<td>BSN</td>
<td>23</td>
<td>11</td>
</tr>
<tr>
<td>MBBS</td>
<td>45</td>
<td>21.53</td>
</tr>
<tr>
<td>CMW</td>
<td>19</td>
<td>9.09</td>
</tr>
<tr>
<td>Nursing Assistant</td>
<td>9</td>
<td>4.3</td>
</tr>
<tr>
<td>Diploma in Nursing</td>
<td>107</td>
<td>51.19</td>
</tr>
<tr>
<td>DPT</td>
<td>6</td>
<td>2.87</td>
</tr>
<tr>
<td><strong>Designation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>134</td>
<td>64.11</td>
</tr>
<tr>
<td>Healthcare assistant</td>
<td>10</td>
<td>4.78</td>
</tr>
<tr>
<td>Midwife</td>
<td>14</td>
<td>6.69</td>
</tr>
<tr>
<td>Doctor</td>
<td>43</td>
<td>20.574</td>
</tr>
<tr>
<td>Technician</td>
<td>2</td>
<td>0.95</td>
</tr>
<tr>
<td>Therapist</td>
<td>6</td>
<td>2.87</td>
</tr>
</tbody>
</table>

**Fig. 1.** Main route of cross transmission of potentially harmful germs between patients in health care facility
Fig. 2. The most frequent source of germs responsible for health care-associated infections

Fig. 3. Minimal time needed for alcohol-based hand rub to kill most germs on hands

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you receive formal training in hand hygiene practice in the last three years?</td>
<td>99</td>
<td>47.37</td>
</tr>
<tr>
<td>Yes</td>
<td>110</td>
<td>52.63</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you routinely use an alcohol-based hand rub for hand hygiene?</td>
<td>179</td>
<td>85.65</td>
</tr>
<tr>
<td>Yes</td>
<td>30</td>
<td>14.35</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. RESULTS

Table 1 shows the demographic data of the study participants. Out of 209 study participants, majority were females 135 (64.6%) and 74 (35.4%) were male participants. Out of 209 participants 39.23% were in the age group of 20-25 years. Majority of participants (74.16%), had more than one-year (work) experience. More than half of the participants had educational qualification with Diploma in Nursing; 11% had BSN, 21.53% had MBBS, 9.09% had CMW, 4.3% had Nursing Assistant, and 2.87% had DPT. Most of the participants were Nurses (134, 64.11%) while 23 (20.58%) were doctors, 14(6.69%) were midwives, 10 (4.78%) were Nursing Assistants, 2 (0.95%) were technicians, and 6 (2.87%) therapists.

Fig. 1 shows the Main route of cross-transmission of potentially harmful germs between patients in health care facilities. Most of the participants 74 (35%) said HCWs’ hands were not clean while 44 (21.05%) participants believed that the main route of cross-transmission is the air circulation in hospital. On the other hand, 55 (26.32%) participants said that the patient’s exposure to colonized surfaces is the main route of cross-transmission and 36 (17%) participants believed that the main route of cross transmission is sharing noninvasive objectives.

Fig. 2 depicts the most frequent sources of germs responsible for health care associated infections. Most of the participants 78 (37.32%) answered that the hospital environment is the most frequent source of germs responsible for health care associated infections.

Fig. 3 Shows the most minimal time needed for alcohol-based hand rub to kill most germs on hands. Most of the participants (128, 60.29%) revealed that the minimal time needed for alcohol-based hand rub to kill most germs on hands is 20 seconds.

Table 2 presents the practice of health care provider about HH. The study groups are categorized on the basis of formal training received. More than half the participants 110 (52.32%) received formal training for HH in the last three years. Most of the participants (179, 85%) highlighted the fact they use alcohol-based hand rub for hand hygiene while 44 (21.05%) do not use alcohol-based hand rub for hand hygiene.

Table 3 shows the study participants knowledge about HH. Study group was categorized based on whether they believed that the use of hand hygiene before touching the patients prevents transmission of germs, 204 (97.61%) said yes and 5 (2.39%) said no. When participants were questioned about whether hand hygiene prevents transmission of germs immediately before a clean/aseptic procedure. 203 (96.7%) said yes and 6 (2.87%) said no. When participants were asked about whether wearing jewelry should be avoided, as associated with increased likelihood of colonization of hands with harmful germs 201 (96.17%) said yes and 6 (3.87%) said no. When participants were asked about whether damaged skin should be avoided, as associated with increased likelihood of colonization of hands with harmful germs; most of the participants 197 (97.26%) said yes and 12 (5.74%) said no. When participants were asked about whether artificial fingernails should be avoided, as associated with increased likelihood of colonization of hands with harmful germs, most of the participants 180 (86.12%) said yes and 29 (13.88%) said no. When participants were asked about whether regular use of a hand cream should be avoided, as associated with increased likelihood of colonization of hands with harmful germs more than half of the participants 110 (52.63%) said yes and 99 (47.33%) said no.

**Table 3. Hand hygiene knowledge questionnaire**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand hygiene before touching the patient prevents transmission of germs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>204</td>
<td>97.61</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>2.39</td>
</tr>
<tr>
<td>Hand hygiene Immediately after a risk of body fluid exposure prevents transmission of germs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>203</td>
<td>97.13</td>
</tr>
</tbody>
</table>
Characteristics | n | %
--- | --- | ---
Hand hygiene Immediately before a clean/aseptic procedure prevents transmission of germs | 201 | 96.17
Hand hygiene after exposure to the immediate surroundings of a patient prevents transmission of germs | 209 | 100.00
Alcohol-based hand rub and handwashing with soap and water are true after touching a patient | 204 | 97.61
Alcohol-based hand rub and handwashing with soap and water are true immediately after a risk of body fluid exposure | 209 | 100
Alcohol-based hand rub and handwashing with soap and water are true after exposure to the immediate surroundings of a patient | 207 | 99.00
Hand rubbing is more rapid for hand cleansing than handwashing | 192 | 91.90
Hand rubbing causes skin dryness more than handwashing | 202 | 96.70
Wearing jewelry should be avoided, as associated with increased likelihood of colonization of hands with harmful germs? | 201 | 96.17
Damaged skin should be avoided, as associated with increased likelihood of colonization of hands with harmful germs? | 197 | 94.26
Artificial fingernails should be avoided, as associated with increased likelihood of colonization of hands with harmful germs? | 180 | 86.12
Regular use of a hand cream should be avoided, as associated with increased likelihood of colonization of hands with harmful germs? | 110 | 52.63

4. DISCUSSION

This study showed that most of the participants possess good knowledge about hand hygiene. 97% participants were aware of knowledge about hand hygiene through which the rate of nosocomial infection is also low in MMIH. Comparatively, India have reported HH compliance ranging from 20–85.5% [19]. In Qassim, Saudi Arabia, 58% of healthcare workers have moderate knowledge of suggested hand hygiene [20]. Other similar studies have shown the influence of multiple variables on nurses' knowledge of hand hygiene [21].

Work experience and occupational type were significantly associated with nurses' knowledge of hand hygiene. Perhaps as nurses gain more practical experience in clinical settings and determine their employment patterns, they will be motivated to learn more and comply with the latest guidelines.

Jang et al. [22] discussed this issue in a different way, noting that as long as HCWs practice hand
hygiene for self-protection, education on this has little impact. They also reported that educating caregivers on good communication patterns, teamwork, and how to adhere to hand hygiene guidelines are important factors despite heavy workloads.

A survey was conducted among the hospitals regarding to variations in knowledge, particularly hand hygiene definitions were attributed to differences in hospital policies, teaching methods, and the conditions of selected neonatal wards (number of new-born, needing a ventilator, number of stations, availability of equipment and management style) [22].

4. CONCLUSION

The purpose of this study was to find out the compliance of hand hygiene among HCW. This study shows that 97% HCW practice good hand hygiene. Both male and female were well aware of hand hygiene practices as well as infection control.

The Nursing Education Services (NES) should continue to implement structured, regular and ongoing training programs in a variety of effective ways to maintain and strengthen caregiver knowledge of hand hygiene and reduce and eliminate knowledge gaps. There is also a need to identify factors that promote nurses’ positive perceptions and attitudes towards hand hygiene.

5. LIMITATIONS

The limitations of study include short period of time and study was limited to one hospital setting, insufficient sample size for statistical measurements and low budget.

CONSENT

As per international standard or university standard, Participants’ written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

This research has been conducted after ethically approved by IRB committee of Memon Medical Institute Hospital.

ACKNOWLEDGEMENT

We are gratifying to all of those who have helped us with data collection the nursing staff of Memon medical institute hospital, faculty members of Memon College of Nursing, research committee, and CEO of Memon Medical Institute Hospital.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Aqeel et al.; J. Pharm. Res. Int., vol. 34, no. 58, pp. 24-34, 2022; Article no.JPRI.94520


Appendix A

Questionnaire

Tick only one answer to each question. Please read the questions carefully before answering. Your answers will be kept confidential.

Part 1. Demographic information
1. Name: __________________ (optional)
2. Age
   a) 20-25
   b) 26-30
   c) 31-35
   d) 36-40
   e) 41-45
   f) 45-50
3. Gender
   a. Male
   b. Female
4. Marital status
   a. Married
   b. Unmarried
   c. Divorced
5. Working experience
   a. 1-year
   b. Less than 1-year
   c. More than 1-year
6. Education
   a. BSN
   b. MBBS
   c. Midwifery
   d. Nursing assistant
   e. RN diploma
7. Profession
   a. Nurse
   b. Healthcare assistant
   c. Midwife
   d. Medical doctor
   e. Technician
   f. Therapist
8. Department
   a. Emergency
   b. Gymea/ LR
   c. OPD
   d. IPD
   e. Private/ Semi Private
   f. ICU
   g. Paediatric Ward

Part 2. Hand hygiene knowledge questionnaire
1. Did you receive formal training in hand hygiene in the last three years?  
   ☐ Yes ☐ No

2. Do you routinely use an alcohol-based hand rub for hand hygiene?  
   ☐ Yes ☐ No

3. Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a health-care facility? (tick one answer only)
a. ☐ Health-care workers’ hands when not clean
b. ☐ Air circulating in the hospital
c. ☐ Patients’ exposure to colonised surfaces (i.e., beds, chairs, tables, floors)
d. ☐ Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients

4. What is the most frequent source of germs responsible for health care-associated infections? (tick one answer only)
   a. ☐ The hospital’s water system
   b. ☐ The hospital air
   c. ☐ Germs already present on or within the patient
   d. ☐ The hospital environment (surfaces)

5. Which of the following hand hygiene actions prevents transmission of germs to the patient?
   a. Before touching a patient ☐ Yes ☐ No
   b. Immediately after a risk of body fluid exposure ☐ Yes ☐ No
   c. Immediately before a clean/aseptic procedure ☐ Yes ☐ No
   d. After exposure to the immediate surroundings of a patient ☐ Yes ☐ No

6. Which of the following statements on alcohol-based hand rub and handwashing with soap and water are true?
   e. After touching a patient ☐ Yes ☐ No
   f. Immediately after a risk of body fluid exposure ☐ Yes ☐ No
   g. Immediately before a clean/aseptic procedure ☐ Yes ☐ No
   h. After exposure to the immediate surroundings of a patient ☐ Yes ☐ No

7. Which of the following statements on alcohol-based hand rub and handwashing with soap and water are true?
   i. Hand rubbing is more rapid for hand cleansing than handwashing ☐ True ☐ False
   j. Hand rubbing causes skin dryness more than handwashing ☐ True ☐ False
   k. Hand rubbing is more effective against germs than handwashing ☐ True ☐ False
   l. Handwashing and hand rubbing are recommended to be performed in sequence ☐ True ☐ False

8. What is the minimal time needed for alcohol-based handrub to kill most germs on your hands? (tick one answer only)
   m. ☐ 20 seconds
   n. ☐ 3 seconds
   o. ☐ 30 seconds
   p. ☐ 10 seconds

9. Which type of hand hygiene method is required in the following situations?
   q. Before palpation of the abdomen ☐ Rubbing ☐ Washing ☐ None
   r. Before giving an injection ☐ Rubbing ☐ Washing ☐ None
   s. After emptying a bedpan ☐ Rubbing ☐ Washing ☐ None
   t. After removing examination gloves ☐ Rubbing ☐ Washing ☐ None
Rubbing  Washing  None

u. After making a patient’s bed

Rubbing  Washing  None

v. After visible exposure to blood

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

w. Wearing jewellery  Yes  No

x. Damaged skin  Yes  No

y. Artificial fingernails  Yes  No

z. Regular use of a hand cream  Yes  No

Appendix B

INFORMED CONSENT FORM

This is Mehwish Aqeel student at Memon College of Nursing conducting the study for the requirement of Bachelor of Science of Nursing Degree. You are invited to participate in this study

By signing in this form you have voluntarily agreed to participate in a research study entitled: “Assess the Knowledge, Attitude and Practice of Healthcare Workers about Hand Hygiene”

To be under supervision of Principal Investigator.

The purpose of the research study on topic “Assess the Knowledge, Attitude and Practice of Healthcare Workers about Hand Hygiene” is to determine the hand hygiene compliance of healthcare team.

You will be requested to fill the questionnaire consist of demographic information and hand hygiene knowledge

There will be no risk.

The study research records will be kept confidential and you will not be identified in any verbal or written reports the research records related to this study will be kept in a secure password protected computer file.

You will not be charged for procedures performed that are purely related to your participation in this study.

Your only 1 hour will be needed in this participation and for any information you can call the supervisor of this study.

Your participation in this study is voluntary. You may be a participant in it only for your wish and you can withdraw from this study at any time.

Name of Participant: ___________________    Signature___________

Researcher Name: XXXXXXXXXX    Signature___________

Email id:

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