

DOI: <https://doi.org/10.47391/JPMA.532>

Perspective of health professionals on hand hygiene in a tertiary care center in Pakistan

Attia Bari¹, Izza Imran², Nasir Ali Nawaz³, Rizwana Kamran⁴, Iqbal Bano⁵, Nadia Sadaqat⁶

1-3,5,6 Department of Paediatric Medicine, The Children's Hospital & The Institute of Child Health Lahore, Pakistan; **4** CMH Lahore Medical College Institute of Dentistry NUMS, Lahore, Pakistan

Correspondence: Attia Bari. **Email:** drattiabari@gmail.com

Abstract

Objective: To determine the awareness of postgraduate residents and nurses working in a tertiary care hospital about hand hygiene.

Method: The cross-sectional study was conducted in October 2018 at The Children's Hospital and the Institute of Child Health, Lahore, Pakistan, and comprised postgraduate residents and nurses. Data was collected using a 31-item self-administered inventory. Data analysis was done using SPSS 21.

Results: Of the 360 subjects, 152(%) were postgraduate residents and 208(%) were nurses. Overall score of knowledge 202(56%) was low compared to attitude 260(72%) and practice 283(78.6%). The combined score of all three domains was 245(68%), indicating moderate awareness. Postgraduate residents had significantly better knowledge 98(64%) compared to nurses 104 (50%) ($p=0.01$), while nurses had better attitude score 159(76.4%) compared to the residents 103(68%) ($p<0.05$). The practice subscale score was not significantly different between the groups ($p>0.05$).

28 **Conclusion:** Both postgraduate residents and nurses showed moderately
29 satisfactory knowledge, attitude and practice towards hand hygiene.

30 **Key Words:** Hand hygiene, Healthcare-associated infections, Postgraduate
31 residents, Nurses, Knowledge, Practices.

32

33 **Introduction**

34 Healthcare-associated infections (HCAIs) are increasingly recognised and
35 drawing attention of health-related regulatory bodies. HCAIs have significant
36 associated morbidity and mortality resulting in increasing cost of treatment, and
37 there is growing evidence that most of these are preventable.⁽¹⁻³⁾ To prevent
38 microbial pathogen cross-transmission and nosocomial infections, hand hygiene
39 (HH) is the most effective measure either by hand-washing practice or use of hand
40 disinfectant.^(4,5)

41 Despite increasing emphasis on hand-washing practices to prevent HCAIs and
42 even the health professionals' having adequate theoretical knowledge about HH,
43 there is poor adherence to HH practice in situations where it needs to be
44 performed.⁽⁶⁻⁸⁾ The important hindering factors with regards to HH are little
45 provision of hand-washing sinks in the wards, lack of automatic taps and hand
46 dryers / paper towels, dry skin and irritation due to frequent use of hand sanitiser
47 / disinfectants and gloves.⁽⁹⁾

48 Continuous efforts are being made towards effective strategies for addressing this
49 problem of HCAIs. The introduction of an evidence-based concept of "My Save
50 moments for hand hygiene" by the World Health Organisation (WHO) is one of
51 the most important efforts in this regard.⁽¹⁰⁾ This concept is aimed at improving
52 the understanding, training, and monitoring of HH practices among healthcare
53 professionals.⁽¹⁰⁾ In order to improve HH practices, the education of healthcare
54 workers is an integral part of relevant strategies. It is a documented fact that by
55 educating healthcare providers, a positive impact is generated on improving HH
56 practices and reducing HCAIs.⁽¹¹⁾ An educational, training and performance

57 feedback programme on HH found that HH compliance improved progressively,
 58 leading to decreased overall nosocomial infection rate of HCAs in an intensive
 59 care unit (ICU).⁽¹²⁾

60 Healthcare providers have an important role for patient safety. Healthcare
 61 workers can acquire bacteria on their hands by touching contaminated surfaces in
 62 a patient's surrounding environment. A simple solution to prevent the spread of
 63 infection is hand-washing before and after patient contact. Healthcare workers
 64 have many opportunities for HH, but it is generally difficult to reach a compliance
 65 level where a change can be made to reduce infection rates.^(4,6,9) The current study
 66 was planned to analyse the perception of HH, knowledge of WHWO hand-
 67 washing guidelines¹³ and practice of HH among post-graduate residents (PGRs)
 68 and nursing staff.

70 **Materials and Methods**

71 The cross-sectional study was conducted in October 2018 at The Children's
 72 Hospital (TCH) and the Institute of Child Health (ICH), Lahore, Pakistan. After
 73 approval from the institutional review board, the sample size was calculated using
 74 Open-Epi online calculator¹⁴ with 95% confidence level and 5% margin of error
 75 on the basis of a total of 250 PGRs and 450 nurses working in ICH.

76 After taking informed verbal consent from all the participants, demographic
 77 information, like gender, profession, year of residency and nursing experience in
 78 years, was obtained anonymously. Subsequently, a self-administered pre-tested
 79 and pre-validated 31-item questionnaire was distributed among the PGRs and
 80 nursing staff, and was collected when completed. It had 17 question on
 81 knowledge, 5 on attitude, and 9 on practice. The questions were answered in terms
 82 of either "Yes" or "No". Correct answer was given 1 score. A total of 12 questions
 83 were considered correct if they were answered "No". The total marks of HH
 84 questionnaire ranged from 0 to 31. Percentages for all question statements were
 85 calculated. Good awareness was represented by higher score. The values for

good, moderate and poor awareness were used based on literature.^(4,15) A score of >75% points was considered good awareness, 50-74% points as moderate awareness, while score <50% points showed poor awareness towards HH. Data was analysed using SPSS 21. Categorical data was expressed as frequencies and percentages. Significance of differences was done using chi-square test. $P < 0.05$ was considered statistically significant.

Results

Of the 550 subjects approached, 190(34.54%) were PGRs and 360(65.45%) were nurses. Of the total, 360(65.45%) subjects completed the questionnaire; 152(42.2%) PGRs and 208(57.8%) nurses (Table 1). Overall score of knowledge 202(56%) was low compared to attitude 260(72%) and practice 283(78.6%). The combined score of all three domains was 245(68%), indicating moderate awareness. Postgraduate residents had significantly better knowledge 98(64%) compared to nurses 104 (50%) ($p=0.01$), while nurses had better attitude score 159(76.4%) compared to the residents 103(68%) ($p < 0.05$). The practice subscale score was not significantly different between the groups ($p > 0.05$) (Figure). No significant differences were found based on the gender of PGRs ($p > 0.05$). In knowledge domain, there was a misconception on the importance and use of antiseptic soap (Table 2). Attitude and practice regarding HH of the two groups were also compared (Table 3).

Discussion

Hands of the hospital staff play a major role in the transmission of nosocomial infection and HH is considered to be the most effective means of preventing infection both in the developing and the developed countries.⁽¹⁻³⁾ In a study from Ireland, the response rate was quite low (37%) compared to the response rate of the current study.⁽¹⁶⁾ The HH compliance was highest in (99.5%) nurses and (91%) PGRs after body fluid exposure, but it was the lowest after touching a

patient's surroundings (61.5%) and (57.5%) in the two groups respectively. In contrast, alcohol-based hand-rub for hand sanitisation was routinely practised more by medical students compared to the nurses.⁽¹⁶⁾ In our study, majority of study participants had the clear knowledge of performing HH as the question “Enforce hand hygiene before and after physically examining the patient” was correctly answered by 83%, but 57.5% said that “Implement hand hygiene only after contact with secretions/bodily fluids”, and 69% agreed that “On unsoiled hands, an alcohol-based hand-rub is recommended over an anti-septic soap hand-washing”.

There was certain misconception about the importance and use of antibacterial soap in HH as 257(71.4%) agreed with the question, “Must use anti-septic soap for proper hand washing”. Our results are comparable with the a study in which 77% said antiseptic soap is essential for hand sanitisation.⁽¹⁷⁾ A recent study about the effectiveness of antiseptic soap showed that these soaps do not have any additional benefit and are not more potent and efficacious than plain soap at reducing microbial contamination.⁽¹⁸⁾

In our study, 64% PGRs and 50% nurses had good knowledge, while 80% PGRs and 77% nurses had good practice of HH. Two studies on hand-washing among healthcare providers showed that 66% and 85% respectively had good knowledge. In both studies nurses had significantly better knowledge, compliance and self-reported practices regarding HH compared to young doctors, but HH practices were low compared to knowledge.^(3,19) Another study from Sri Lanka showed that 77% participants were knowledgeable, but <50% in the study practised good HH.⁽¹⁵⁾ Contrary to these studies, our practice results were better, but we did not find any difference between PGRs and nurses. Similar results were shown in a study from Nigeria in which majority respondents had good knowledge about HH and they considered it a most common vehicle of transmission of infection, but only one-third of all physicians practised the six

steps of the hand-washing technique and large proportion of hand-washing technique defaulters were resident doctors.⁽²⁰⁾

An observational study on medical students who took part in the annual patient safety training course reported that while entering an ICU, 150 medical students failed to perform HH, demonstrating that compliance was low even when medical students received intensive education on HH. There was male preponderance over female.⁽²¹⁾ A similar study showed no significant difference between the genders.⁽²⁰⁾ In our study, based on the gender of PGRs, no significant difference was found ($p > 0.05$) which is in line with literature.⁽²²⁾

HH practices are different in different institutions. In a Canadian Patient Safety Culture Survey, the researcher gathered HH observations from three different healthcare centres and it was reported that the rates of HH practices varied widely, ranging from 35% to 77%.⁽²³⁾ In our study, the practices were 80% among PGRs and 77% among nurses. The factors considered to be responsible for barrier towards HH practice and adherence were "lack of hand-washing facility; soap, sinks, water availability and disposable towel" narrated in study showing overall compliance with HH practices to be 38.8%.⁽⁹⁾

In terms of limitations, the current study was conducted at a single centre and the results, as such, are not generalisable. More studies from other tertiary care hospitals the country, including those based on observations rather than self-reporting, would draw a clear picture of the prevailing situation.

Conclusion

Both PGRs and nurses showed moderately satisfactory knowledge, attitude and practice towards HH. Postgraduate residents had better knowledge compared to the nurses, but the difference was not significant in terms of attitude and practice.

172 **Disclaimer:** None.

173 **Conflict of Interest:** None.

174 **Source of Funding:** None.

175

176 **References**

- 177 1. Patricia W. Stone¹, Monika Pogorzelska¹, Laureen Kunches² and LRH.
 178 Hospital Staffing and Health Care–Associated Infections: A Systematic Review
 179 of the Literature. Clin Infect Dis. 2008;47:937–944.
- 180 2. Joshi S, Diwan V, Joshi R, Sharma M, Pathak A, Shah H, et al. “How Can
 181 the Patients Remain Safe, If We Are Not Safe and Protected from the Infections”?
 182 A Qualitative Exploration among Health-Care Workers about Challenges of
 183 Maintaining Hospital Cleanliness in a Resource Limited Tertiary Setting in Rural
 184 India. Int J Environ Res Public Health. 2018;15:1-14.
- 185 3. Jemal S. Knowledge and Practices of Hand Washing among Health
 186 Professionals in Dubti Referral Hospital, Dubti, Afar, Northeast Ethiopia. Adv
 187 Prev Med. 2018;1–7.
- 188 4. Nair SS, Hanumantappa R, Hiremath SG, Siraj MA, Raghunath P.
 189 Knowledge, Attitude, and Practice of Hand Hygiene among Medical and Nursing
 190 Students at a Tertiary Health Care Centre in Raichur, India. Prev Med. 2014;1–4.
- 191 5. Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S et
 192 al. Effectiveness of a hospital-wide programme to improve compliance with hand
 193 hygiene. Infection Control Programme. Lancet Infect Dis. 2000;356:1307–12.
- 194 6. Silva D, Andrade O, Silva E. Perspective of health professionals on hand
 195 hygiene. Aten Primaria. 2014; 46:135–9.
- 196 7. Khanal G, Thapa S. Awareness of hand hygiene among health care workers
 197 of chitwan, nepal. SAGE. 2017;7:1–7.
- 198 8. Kotwal A, Anargh V, Singh H, Kulkarni A, Mahen A. Hand hygiene
 199 practices among health care workers (HCWs) in a tertiary care facility in Pune.
 200 Med J Armed Forces India. 2013;69:54–6.

- 201 9. Anwar MA, Rabbi S, Masroor M, Majeed F, Andrades M, Baqi S. Self-
202 reported practices of hand hygiene among the trainees of a teaching hospital in a
203 resource limited country. *J Pak Med Assoc.* 2007;59:631–4.
- 204 10. Boudjema S, Brouqui P. World Health Organization "SAVE LIVES: Clean
205 Your Hands" global campaign. *Clin Microbiol Infect.* 2018; 24(4): 442.
- 206 11. Mathai E, Allegranzi B, Seto WH, Chraïti M-N, Sax H, Larson E, et al.
207 Educating healthcare workers to optimal hand hygiene practices: addressing the
208 need. *Infection.* 2010;38:349–56.
- 209 12. Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection
210 with improved hand hygiene in intensive care units of a tertiary care hospital in
211 Argentina. *Am J Infect Control.* 2005;33:392–7.
- 212 13. WHO guidelines on hand hygiene in health care – WHO
213 <https://www.who.int/gpsc/5may/tools/9789241597906/en/> (web accessed on
214 4.5.19)
- 215 14. Sullivan KM, Dean A, Soe MM. OPENEPI: A Web-based Epidemiologic and
216 Statistical Calculator for Public Health. *Public Health Rep.* 2009;124 (3):471-74.
- 217 15. Ariyaratne M, Gunasekara T, Weerasekara M, Kottahachchi J,
218 Kudavidanage B, Fernando S. Knowledge, attitudes and practices of hand
219 hygiene among final year medical and nursing students at the University of Sri
220 Jayewardenepura. *Sri Lankan J Infect Dis.* 2013;3:15-25
- 221 16. Kingston LM, O’Connell NH, Dunne CP. A comparative study of hand
222 hygiene and alcohol-based hand rub use among Irish nursing and medical
223 students. *Nurse Educ Today.* 2018;63:112–8.
- 224 17. Abu-Zaid A, Alshamqity A, Hamadah R, Kharraz R, Eshaq AM, AlFawaz
225 D. Hand Hygiene: Knowledge and Attitudes of Fourth-Year Clerkship Medical
226 Students at Alfaisal University, College of Medicine, Riyadh, Saudi Arabia.
227 *Cureus.* 2015;1–7.
- 228 18. Wise J. Ordinary soap is as effective as antibacterial soap for handwashing,
229 study finds. *BMJ.* 2015;351:h4944.

19. Salman M, Raza MH, Ul Mustafa Z, Shrestha S, Ali M, Fahham H, et al. Knowledge, attitudes and practices of hand hygiene among pakistani health professionals: A cross-sectional study. *J Infect Dev Ctries*. 2018;12:63–6.
20. Adegboye MB, Zakari S, Ahmed BA, Olufemi GH. Knowledge, awareness and practice of infection control by health care workers in the intensive care units of a tertiary hospital in Nigeria. *Afr Health Sci*; 2018;18:72-78
21. Birnbach DJ, Rosen LF, Fitzpatrick M, Arheart KL, Everett-Thomas R. Current hand hygiene education is suboptimal. *Clin Teach J* 2019;16:1–4.
22. al Kadi A, Salati SA. Hand Hygiene Practices among Medical Students. *Interdiscip Perspect Infect Dis*. 2012;1–6.
23. Bernard L, Biron A, Lavigne G, Frechette J, Bernard A, Mitchell J, et al. An exploratory study of safety culture, biological risk management and hand hygiene of healthcare professionals. *J Adv Nurs*. 2018;74:827–37.

Table 1: Demographic characteristics.

Category	Total n = 360 (100%)
Profession	
Postgraduate resident	152 (42.2)
Nurse	208 (57.8)
Gender (PGR)	
Male	48 (31.6)
Female	104 (68.3)
Year of training (PGR)	
1 st Year	67 (44)
2 nd year	29 (19)
3 rd year	23 (15)
4 th year	20 (13)
Training complete	13 (9)
Year of experience (Nurses)	
< 5 years	51 (24.5)
5-10 years	93 (44.7)
>10 years	64 (30.8)

PGR: Post-graduate resident.

270 -----

271

272 **Table 2: Knowledge Responses of Post-graduate residents (PGRs) and Nurses towards**
 273 **hand hygiene (HH)**

S. no	Health professional's Knowledge towards hand hygiene	Answer	Correct Ans PGRs n (%)	Correct Ans Nurses n (%)	p-value
1	Traditional hand washing (water plus regular soap) decreases the number of germs	Yes	135 (88)	201 (96.6)	0.003
2	Using gloves eliminates the necessity to wash hands	No	126 (83)	84 (40.4)	<0.001
3	Hand washing is required before and after wearing gloves	Yes	124 (81.6)	136 (65.4)	0.001
4	Using instant hand sanitizer to quickly wash hands is always adequate	No	95 (62.5)	67 (32.2)	<0.001
5	Must use anti-septic soap for proper hand washing	No	31 (20.4)	72 (34.6)	0.003
6	Must use both anti-septic soap plus hand sanitizer for proper hand washing	No	60 (40)	92 (44.2)	0.452
7	After washing hands, turn off water taps with your hands	No	117 (77)	80 (38.5)	<0.001
8	After washing hands, turn off taps using piece of paper towel	Yes	82 (54)	144 (69.2)	0.002
9	Perform hand hygiene only before encountering patient (even without performing physical examination)	No	93 (61.2)	81 (39)	<0.001
10	Perform hand hygiene only after encountering patient (even without performing physical examination)	No	89 (58.6)	69 (33.2)	<0.001
11	Perform hand hygiene before and after encountering each patient (even without doing physical examination)	Yes	121 (79.6)	167 (80.3)	0.894
12	Enforce hand hygiene only before physically examining the patient	No	102 (67)	66 (31.7)	<0.001
13	Enforce hand hygiene only after physically examining the patient	No	104 (68.4)	51 (24.5)	<0.001
14	Enforce hand hygiene before and after physically examining the patient	Yes	137 (90)	162 (78)	0.003
15	Implement hand hygiene only after contact with secretions/bodily fluids (resp. secretions, saliva, vomit and blood)	No	87 (57.2)	66 (31.7)	<0.001
16	On unsoiled hands, an alcohol-based hand rub is recommended over an anti-septic soap hand washing	Yes	89 (58.6)	160 (77)	<0.001
17	On unsoiled hands, an alcohol-based hand rub is recommended over a 3-minute surgical scrub	No	63 (41.4)	26 (12.5)	<0.001

274

275 -----

276

277 **Table 3: Attitude and Practices of Post-graduate residents (PGRs) and Nurses towards**
 278 **hand hygiene (HH).**

S. no	Health professional's perceived attitudes towards hand hygiene	Answer	Correct Ans PGRs n (%)	Correct Ans Nurses n (%)	p-value
-------	--	--------	------------------------	--------------------------	---------

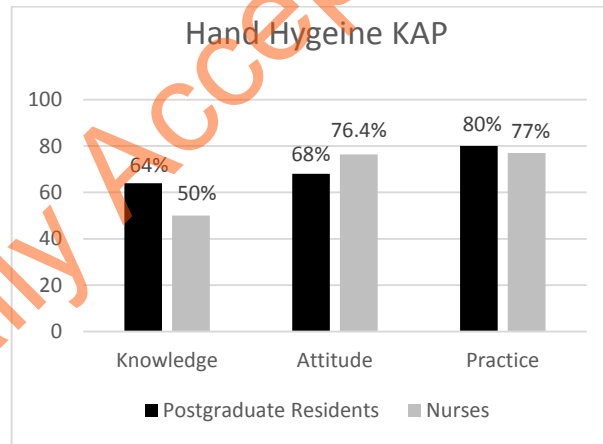
1	Before starting my clinical training, I reviewed the respective WHO and CDC guidelines for hand hygiene.	Yes	52 (34.2)	165 (79.3)	<0.001
2	Healthcare providers are educating patients and their families about hand hygiene and its importance	Yes	112 (73.7)	129 (62)	0.023
3	Proper hand hygiene is an important matter to be emphasized in medical curricula and health care centres	Yes	145 (95.4)	183 (88)	0.015
Practices/ Steps of hand washing practice among health professionals					
1	Removing rings, bracelets and watches	Yes	129 (85)	188 (90.4)	0.138
2	Removing rings and watches	Yes	119 (78.3)	148 (71.2)	0.144
3	Wetting hands and applying enough soap to cover all surfaces	Yes	139 (91.4)	160 (77)	<0.001
4	Scrubbing one palm with the other palm	Yes	135 (89)	177 (85)	0.348
5	Rubbing right palm with back of the left hand and vice versa	Yes	128 (84.2)	176 (84.6)	1.000
6	Scrubbing between fingers and nails	Yes	139 (91.4)	176 (84.6)	0.055
7	Rubbing wrists and thumbs	Yes	129 (85)	165 (79.3)	0.215
8	Washing hands from the fingers towards the wrist	Yes	122 (80.3)	157 (75.5)	0.308
9	Drying hands with disposable paper towel or drying hands in air	Yes	112 (73.7)	163 (78.7)	0.313
10	Turning off the tap with the hands	No	106 (69.7)	83 (40)	<0.001
11	Turning off the tap with the aid of disposable towel	Yes	78 (51.3)	170 (81.7)	<0.001

279 WHO: World Health Organisation; CDC: Centre for Disease Control and Prevention.

280

281 -----

282



283

284 **Figure: Knowledge, attitude and practices (KPA) of hand hygiene (HH) among study**

285 **participants.**

286