

Hand Hygiene Awareness and Knowledge Among Healthcare Personnel in The Dawadmi Region of Saudi Arabia: A Cross-Sectional Survey Study

Prasanna Mohana Bhaskaran¹, Mohammed Nawar Alotaibi², Inbaraj Susai Dominic^{1,*}, Bhaskaran Ashokan³, Sudharshan Reddy Dachani⁴, Semmal Syed Meerasa³, Osama Mohammed Alruways⁵

Prasanna Mohana Bhaskaran¹, Mohammed Nawar Alotaibi², Inbaraj Susai Dominic^{1,*}, Bhaskaran Ashokan³, Sudharshan Reddy Dachani⁴, Semmal Syed Meerasa³, Osama Mohammed Alruways⁵

¹ Faculty, College of Medicine - Al-Dawadmi Campus, Shaqra University

² Final year Medical Student, College of Medicine - Al-Dawadmi Campus, Shaqra University

³ Faculty, College of Medicine - Shaqra Campus, Shaqra University

⁴ Faculty, College of Pharmacy - Al-Dawadmi Campus, Shaqra University

⁵ Second year Medical Student, College of Medicine - Al-Dawadmi Campus, Shaqra University

Correspondence

Inbaraj Susai Dominic

Faculty, College of Medicine - Al-Dawadmi Campus, Shaqra University, SAUDI ARABIA.

E-mail: inbaraj4@yahoo.co.in

History

- Submission Date: 23-02-2023;
- Review completed: 11-04-2023;
- Accepted Date: 19-04-2023.

DOI : 10.5530/pj.2023.15.86

Article Available online

<http://www.phcogj.com/v15/i6>

Copyright

© 2023 Phcogj.Com. This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International license.

ABSTRACT

Introduction: The outcome of patient care in healthcare settings is influenced predominantly by healthcare-associated infections (HAIs). Hand hygiene is the single most essential component in avoiding HAIs. **Objectives:** The aim of the study is to evaluate the awareness and knowledge about hand hygiene among the healthcare personnel in the Dawadmi Region of Saudi Arabia. **Materials and Methods:** This cross-sectional survey study was carried out between May till September 2021. The tool (Questionnaire revised in 2009), validated according to CROSS (Checklist for Reporting of Survey Studies) check list. **Results:** A total of 300 participants were randomly enrolled, 60 were nursing assistants, 140 nurses, and 100 residents, were enrolled in this study. With respect to years of experience in hand washing, 123 participants had 1–5 years (41%), 6–10 years (80%), 11–20 years (77%), and greater than 30 years of participation (6.67%). Concerning the education of hand washing and hygiene, training programs were attended by 230 participants (76.67%), and 70 participants (23.33%) did not attend the latest training program conducted by each institution. Most of them (83.33%) were using alcohol for hand hygiene. **Conclusions:** This study has clearly shown the requirement of an in-depth appraisal of important issues of compliance and patient safety. Educational interventions to recognize the hand hygiene opportunities, improved availability of hand hygiene facilities and multifaceted approach to tackle various barriers (poor attitude, workload, etc) of adherence are needed to be accorded priority. **Key words:** Awareness, Cross infection, Hand hygiene, Healthcare workers, Knowledge.

INTRODUCTION

The global burden of infections acquired by patients during therapy in healthcare settings is enormous. The most common mode of germ transmission during treatment is through contaminated hands. *Proteus mirabilis*, *Staphylococcus aureus*, *Clostridium difficile*, *Acinetobacter spp.*, *enterococci*, or *Klebsiella spp.* were the most common pathogens associated with healthcare-associated infections (HAIs).¹ The source of infection was colonized areas of the patient's skin, infected or draining wounds, the patient's bed linen, gowns, bedside furniture, and other objects in the patient's immediate vicinity.² Hand hygiene (HH) is an efficient approach to avoid infections. It involves either utilizing an alcohol-based hand rub or washing hands with water and soap. It is the responsibility of the healthcare employees, indirectly or directly taking part in patient care to carry out HH in an effective manner.³ The challenging part in the implementation of the effective methods of HH is securing compliance among healthcare workers, although the procedures are relatively simple.² Lack of persuasion, working status, insufficient awareness, increased workload, and lack of awareness in implementation guidelines are all obstacles to the application of appropriate hand hygiene practices.⁴⁻⁸ In spite of the high occurrence of HAIs, a less number of researches in Asia examined this topic in this region of the world.⁹ Given that the first and most crucial step in decreasing nosocomial

infections caused by inadequate HH is increasing healthcare worker awareness, and also on account of the lack of recognition paid to this problem in our locality, identifying information about HH routine can be beneficial.¹⁰ The purpose of this analytical study was to assess the healthcare staff's knowledge of HH practices and to recognize areas of knowledge gaps.

MATERIAL AND METHODS

Research design and setting

This was a cross-sectional survey study, carried out in various private healthcare settings and general hospitals in the Dawadmi region between May 2021 and September 2021. The hospitals have specialized infection control measures as well as hand hygiene training sessions for workers.

Sample size estimation

The sample size for this cross-sectional investigation was estimated using the following formula: $1.962 \times P(1-P) / d^2$ where $P = 50$ (50%-conservative estimate of the anticipated knowledge score of 50% that was extracted from literature of similar researches) and $d = 0.05$. The estimated sample size is $3.84 \times 0.5(1-0.5) / 0.0025 = 384$.

Inclusion and exclusion criteria

Inclusion: All the Medical and Paramedical healthcare professionals were included in the study.

Cite this article: Bhaskara PM, Alotaibi MN, Dominic IS, Ashokan B, Dachani SR, Meerasa SS. Hand Hygiene Awareness and Knowledge Among Healthcare Personnel in The Dawadmi Region of Saudi Arabia: A Cross- Sectional Survey Study. Pharmacogn J. 2023;15(3):368-371.

Exclusion: Non-medical workers in the hospitals (Receptionists, Cashier, House-keeping workers, Cafeteria workers) are NOT included in the study.

Sampling method

A simple random selection procedure was used to choose around 300 healthcare staff based on the projected sample size. The three vital wards in these two hospitals were general internal medicine wards, emergency wards, and intensive care units (ICUs). Personnel were asked to participate in the study based on the list of staff. If they did not comply with filling out the questionnaire, the next person on the list was invited. Sampling was carried out until the required sample size was reached.

Data collection

"WHO (The World Health Organization) Hand Hygiene Knowledge Questionnaire" (updated 2009 version) was utilized to acquire data in this study. "Hand Hygiene Knowledge Questionnaire" included the participants' gender, age, occupation, course year, formal HH training, and 27 multiple-choice and "yes" or "no" questions to measure their HH knowledge. Each right answer was given one point, while incorrect answers were given zero. Overall results were reported in percentages, with a score of more than 75% considered good, 50–74% considered moderate, and 50% regarded poor knowledge. An occupational medical professional translated the questionnaire into Persian. Following that, six more specialists (including two an internist, two emergency medicine specialists, an epidemiologist, and occupational medicine specialists) remarked on the accuracy of the questionnaire. Each question was examined by the expert group and labelled as beneficial, required, or not necessary. For each query, CVR (content validity ratios) were computed. The questionnaire's content validity index was 0.8, and the tool's validity was accepted.

Statistical analysis

The data was analysed using descriptive statistics (mean, standard deviation) using SPSS version 21.0 and Microsoft Excel spreadsheet.

Ethics

The study protocol was in conduct to the ethical guidelines of the 1975 declaration of Helsinki. All the healthcare workers were informed about the procedures of the study, and verbal informed consent was acquired from all the participants included in the study. The study was approved by the Institutional Ethics Committee.

Table 1: Demographic characteristics of the study population (n=300).

Variable	Frequency n (%)
Age group	21-30 years 100 (33.33)
	31-40 years 120 (40)
	41-50 years 80 (26.67)
Gender	Male 170 (56.67)
	Female 130 (43.33)
Profession	Residents 100 (33.33)
	Nurse 140 (46.67)
	Nursing assistant 60 (20)
Years of experience	≤ 5 123 (41)
	6- 10 80 (26.67)
	11-20 77 (25.67)
	≥ 30 20 (6.67)
Previous training program	No 70 (23.33)
	Yes 230 (76.67)
Routinely use alcohol-based hand rub for hand hygiene	No 50 (16.67)
	Yes 250 (83.33)

Table 2: Assessment of knowledge and awareness on hand hygiene among health care workers (n=300).

S. No.	Items	Frequency n (%)
1	What is the most frequent source of germs responsible for healthcare-associated infections? The hospital environment (surface)	235 (78.33)
2	Which of the following hand hygiene actions prevents transmission of germs to the health care workers?	
	a. use of gloves.	267 (89)
	b. use alcohol hand rubs.	253 (84.33)
3	c. after exposure to the immediate surroundings of patients.	255 (85)
	Which type of hand hygiene method is required in the following situations?	
	a. before palpation of the abdomen/ rubbing with alcohol-based hand rubs.	211 (70.33)
	b. before giving injection/ none.	189 (63)
4	c. after removing examination gloves/ hand washing.	162 (54)
	d. after visible exposure to blood/ rubbing with alcohol-based hand rubs.	183 (61)
	In general, what is the impact of a healthcare-associated infection on a patient's clinical outcome? High	193 (64.33)
	5	What is the effectiveness of hand hygiene in preventing healthcare-associated infection? High
6	What factors prevent you from performing hand hygiene as recommended?	
	a. lack of time/ too busy.	191 (63.67)
	b. lack of alcohol-based hand rub.	183 (61)
	c. forgetfulness	183 (61)
	d. nobody else does	167 (55.67)
	e. it is not important	165 (55)
	f. use gloves instead	223 (77.67)
	g. lack of towels	185 (61.67)
h. short patient contact	192 (64)	
7	Did you receive formal training in hand hygiene in the last three years?	
	Yes 210 (70)	
8	No 90 (30)	
	To what degree do you think there is a relationship between good hand hygiene practice and hospital-acquired infections? Strong	174 (58)
	Rate your satisfaction with hand hygiene practice (including glove practice) currently, used in your hospital? Satisfied	177 (59)
9	Has the use of an alcohol-based hand rub made hand hygiene easier to practice in your daily work?	
	Yes 196 (65.33)	
10	No 104 (34.67)	
	Is the use of alcohol-based hand rubs well tolerated by your hands?	
11	Yes 174 (58)	
	No 126 (42)	
12	Do you consider that the administrators in your institution are supporting hand hygiene improvement?	
	Yes 226 (75.33)	
13	No 74 (24.67)	
	Do you feel that you can improve your compliance with hand hygiene?	
13	Yes 211 (70.33)	
	No 89 (29.67)	

RESULTS

Demographic details

In our study, we randomly enrolled 300 participants. A significant proportion of participants -120 (40%) were between the age groups of 31-40 years, 100 (33.33%) were between the age group of 21-30 years, and 80 (26.67%) were between the age group of 41-50.170 (56.67%) were male and 130 (43.33%) were female participants. Among the 300 participants, 140 (46.67%) had registered their profession as nurses, 100 (33.33%) were residents, and 60 (20%) were nursing assistants. (Table 1)

In terms of years of experience in hand washing, 123 of the 300 participants had 1-5 years (41%), 6-10 years (80%), 11-20 years (77%), and more than 30 years (20%). Previous training programs were attended by 230 participants (76.67%), and 70 participants (23.33%) were not present. The vast majority of them (83.33 percent) used alcohol for personal hygiene.

Assessment of knowledge on hand hygiene

As shown in table 2, a large percentage of healthcare workers (235, or 78.33 %) believed that the hospital environment was the major prevalent cause of hospital infections. A majority of 193 respondents (64.33%) agreed that HCAI had a significant impact on patients' clinical outcomes; a majority (74%) stated that hand hygiene was quite effective in preventing HCAI.

In this study, we observed that healthcare personnel were more likely to use alcohol-based hand rubs after evident blood exposure (61%), hand cleaning after removing examination gloves (54%), and before providing injections (63%). However, participants reported that using alcohol-based hands before exercise was more common (70.33 percent) than hand washing.

Most of the healthcare workers recognized a lack of resources as a factor that prevented them from executing hand hygiene, with 223 (77.67 percent) choosing gloves as the contributory factor, 183 (61 percent) citing forgetfulness, 183 (61 percent) citing a lack of alcohol hand rub, 185 (61.67 percent) citing a lack of towels to wipe hands, and 191 (63.67 percent) citing a lack of time. In our survey, we discovered that the majority of 210 (70%) of participants believed they could enhance individual adherence with hand hygiene practices.

Hand hygiene indications -hand washing or hand rub

In our study, the majority of the healthcare workers recognized the following indications for HH achieved either by utilizing hand rubs that are alcohol-based or hand washing, with 82% (246) reporting the necessity for HH after exposure to the proximate environment of a patient, 77.67% (233) instantly after the exposure to body fluid, 77.67% (233) promptly before a aseptic/clean procedure, and 71.67% (215) before direct skin-to-skin contact with a patient. Each of the recommended hand hygiene techniques was thought to be effective by one-half of the healthcare professionals. (Table 3)

Hand hygiene improvement measures

As shown in table 4, most often indicated method for ensuring effective HH was institutional and senior management promotion and support of HH practice, 233 (77.67 percent).

DISCUSSION

HH is a reasonably easy and economical strategy that has been implemented in diverse establishments to avert HAIs. The demographic details of the participants involved in our study reveals that there is uniform distribution of the various categories of healthcare personnel. This is in contrast to a study conducted in ICU settings of tertiary care hospitals in Turkey in which it was observed that the majority (41.3%) participation was by the nurses employed in ICU settings.¹¹

Table 3: Hand hygiene indications -hand washing or hand rub for different indications.

Procedure	Indications for hand hygiene	
	Yes n (%)	No n (%)
Before touching a patient	215(71.67%)	85(28.33%)
Immediately after the risk of body fluid exposure	233(77.67%)	67(22.33%)
After exposure to the immediate surroundings of a patient	246(82%)	54(18%)
Immediately before a clean/ aseptic procedure	233(77.67%)	67(22.33%)

Table 4: Healthcare workers' perspectives on the efficacy of hand hygiene improvement measures.

Hand hygiene measure	Not effective n (%)	Very effective n (%)
Each health worker receives education on hand hygiene	62(20.67%)	238(79.33%)
Clear and simple instructions for hand hygiene are made visible for every health care worker	67(22.33%)	233(77.67%)
Leaders and senior managers at your institution support and openly promote hand hygiene	67(22.33%)	233 (77.67%)
The healthcare facility makes alcohol-based hand rub always available at each point of care	81(27%)	219(73%)

The assessment of knowledge and awareness regarding the HH among the participants revealed that Alcohol-based hand rubs are ideal for HH. This is in concordance with the recommendations according to the WHO (World Health Organization). Pittet *et al.* found that despite the fact that the pharmacy had adequate stock, it was not dispersed to the various units, thus causing unavailability of alcohol-based hand rub in various units.¹⁰

Most of the participants in this study practiced HH as per the recommendation for different indications of patient care. In contrast to our study, a study conducted among tertiary care institutions in U.S, the healthcare workers favoured washing hands with soap and water over alcohol-based rubs.¹²

In a research of healthcare workers in the United States, the mean self-reported adherence rate was 84 percent, but when omitting out on occasions was taken into consideration, the total compliance percentage was only 38.4 percent.¹³

Among the various factors affecting the compliance of HH, availability of hand rub, training of the healthcare personnel on HH plays a significant role. This is evident from the review which reveals that the majority of the situations that were associated with a higher compliance rate were training of healthcare personnel, the introduction of alcohol-based hand rub or gel, performance feedback, and accessibility of materials.¹⁴ The non-compliance variables recognized in our study also correspond to those found in a review of impediments to effective hand hygiene.¹⁵

Limitations of this study

There are a few drawbacks to this research. To prove that the findings in this study are statistically significant, the statistical data in this study must be validated on a large sample size. The study needs to be modified by an assessment of the HH awareness before and after the execution of effective training methods for healthcare workers on hand hygiene.

Despite these limitations, this study has provided valuable information regarding the healthcare worker's perception regarding the eminence of HH in the prevention of HAI. This study being a cross-sectional study, has involved different categories of healthcare personnel employed in hospitals and polyclinics. The study being conducted in hospitals under the

MOH (Ministry of Health) and in the private sector has made an obvious observation about the mandatory requirement for a dedicated infection control team, which will emphasize the eminence of hand hygiene.

In this questionnaire-based study, response bias may have led to overestimation of compliance. A triangulation with observation of HCWs was not done because if it is done with their knowledge then Hawthorne effect comes into play and if done without their knowledge then ethical considerations need to be discussed.

RECOMMENDATION

The recommendations from the above study are as follows:

The training of all healthcare workers on the significance of hand hygiene is the key process in achieving a phenomenal change in the attitude of healthcare workers towards the prevention of HAIs. All categories of healthcare workers need to be aware of hand hygiene before they are inducted into inpatient care. There is an absolute need for a dedicated infection control team in every healthcare setting, irrespective of their in-patient bed strength and out-patient volume. Periodic assessment of compliance with hand hygiene among healthcare workers has to be made by the infection control team. Interventions based on the periodic assessment of hand hygiene compliance will be planned and executed by the infection control team. Adequate budgeting has to be planned by the management of the healthcare facilities for the consumables, training of the new healthcare workers, assessment process, and implementation based on an assessment to provide a hundred percent safe environment for the patients.

CONCLUSION

To conclude, this study has clearly shown the requirement of an in-depth appraisal of important issues of compliance and patient safety. Educational interventions to recognize the hand hygiene opportunities, improved availability of hand hygiene facilities and multifaceted approach to tackle various barriers (poor attitude, workload, etc) of adherence are needed to be accorded priority. This has to be a part of the overall strategy of improving the adherence to universal precautions in tertiary care hospitals.

ADDITIONAL INFORMATION

Human subjects: Verbal consent was obtained from all the participants of this study.

Animal subjects: All authors have confirmed that this study did not involve animal subjects or tissues.

Financial support and sponsorship: Nil

CONFLICTS OF INTEREST

In compliance with the ICMJE uniform disclosure form, all authors declare the following:

Payment/services info: All authors have declared that no financial support was received from any organization for the above submitted work.

Financial relationships: All authors have declared that they have no financial relationships at present or within previous three years with any organizations that might have interest in the submitted work.

Other relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

Acknowledgements: The authors thank the Deanship of Scientific Research at Shaqra University for supporting the study.

The authors also thank the Dean, Vice-dean and Head of the Department, College of Medicine-Dawadmi, Shaqra University for their support and encouragement.

REFERENCES

1. Trampuz A, Widmer AF. Hand Hygiene: A frequently missed lifesaving opportunity during patient care. *Mayo Clin Proc.* 2004;79(1):109-16.
2. Haque M, Sartelli M, McKimm J, Bakar MA. Health care-associated infections - an overview. *Infect Drug Resist.* 2018;15(11):2321-33.
3. Subbalakshmi E, Abirami P, Vidhya S, Sumitha, Kalavathy HV. Awareness of Hand Hygiene in Hospital Set-up for Infection Control : Knowledge-based Questionnaire for Health Care Workers in a Teaching Hospital. *Biomed Pharmacol J.* 2020;13(4):1773-9.
4. Thakker VS, Jadhav PR. Knowledge of hand hygiene in undergraduate medical, dental, and nursing students: A cross-sectional survey. *J Family Med Prim Care.* 2015;4(4):582-6.
5. Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S, *et al.* Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Infection Control Programme.* *Lancet.* 2000;356(9238):1307-12.
6. Longtin Y, Sax H, Allegranzi B, Schneider F, Pittet D. Videos in clinical medicine hand hygiene. *N Engl J Med.* 2011;364(13):e24.
7. Tibballs J. Teaching hospital medical staff to handwash. *Med J Aust.* 1996;164(7):395-8.
8. Trampuz A, Widmer AF. Hand hygiene: A frequently missed lifesaving opportunity during patient care. *Mayo Clin Proc.* 2004;79(1):109-16.
9. Boyce JM, Pittet D. Healthcare Infection Control Practices Advisory Committee; HICPAC/SHEA/APIC/IDSA HH Task Force. Guideline for Hand Hygiene in Health-Care Settings. Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. Society for Healthcare Epidemiology of America/Association for Professionals in Infection Control/Infectious Diseases Society of America. *MMWR Recomm Rep.* 2002;51(RR-16):1-45.
10. Pittet D, Donaldson L. Clean care is safer care : the first Global Challenge of the World Health Organization World Alliance for Patient Safety. *Infect Control Hosp Epidemiol.* 2006;10(6):891-9.
11. Karabay O, Sencan I, Sahin I, Alpteker H, Ozcan A, Oksuz S. Compliance and efficacy of hand rubbing during in-hospital practice. *Med Princ Pract.* 2005;14(5):313-7.
12. Haley RW, Culver DH, White JW, Morgan WM, Emori TG, Munn VP. The efficacy of infection surveillance and control programs in preventing nosocomial infections in US hospitals. *Am J Epidemiol.* 1985;121(2):185-205.
13. Lark RL, VanderHyde K, Deeb GM, Dietrich S, Massey JP, Chenoweth C. An outbreak of coagulase-negative staphylococcal surgical-site infections following aortic valve replacement. *Infect Control Hosp Epidemiol.* 2001;22(10):618-23.
14. Erasmus V, Daha TJ, Brug H, Richardus JH, Behrendt MD, Vos MC, *et al.* Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Control Hosp Epidemiol.* 2010;31(3):283-94.
15. Larson EL, Albrecht S, O'Keefe M. Hand hygiene behavior in a pediatric emergency department and a pediatric intensive care unit : comparison of use of 2 dispenser systems. *Am J Crit Care.* 2005;14(4):304-11.

Cite this article: Bhaskara PM, Alotaibi MN, Domic IS, Ashokan B, Dachani SR, Meerasa SS. Hand Hygiene Awareness and Knowledge Among Healthcare Personnel in The Dawadmi Region of Saudi Arabia: A Cross- Sectional Survey Study. *Pharmacogn J.* 2023;15(3):368-371.