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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.

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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

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domain. Multivariate analysis showed that work experience and previous education were the most important predictors of participants' knowledge of hand hygiene.
Conclusion: Hand hygiene is the simplest yet effective way to stop the spread of germs/microbes non-invasive independent predictors for screening esophageal varices may reduce medical as well as financial burden, hence improving the management of cirrhotic patients. These predictors, however, need further work to validate reliability.

Keywords: Hand hygiene; nurses; healthcare workers; infection-prevention; knowledge; attitude; practice.

1. INTRODUCTION

Hand hygiene is the compliance of cleaning hands with cleaning soap and water or with antiseptic hand rub to remove temporary microorganisms from hands and preserve the integrity of the skin [1]. It is one of the most significant issues in the world and the chain of infection can be broken by hand hygiene compliance which will decrease health related infections [2]. The human hand contain abundance of microorganisms during dealing with patients unless there is hand hygiene compliance following recommended guidelines [3, 4]. Morbidity, length of stay, and treatment cost increase with Healthcare associated infections (HAI), which can be reduced by following infection control guidelines [5].

Hospital acquired infections are rather common, with an average prevalence according to the World Health Organization it is about 5-10% in developed countries and around 40% in developing countries [6].

Transmission of the pathogen among the patients can be potentially caused through the hands of healthcare workers (HCW). Manifestations of the hand hygiene programs reached a high standard in care for the patients and decrease HAIs by about one infection per 1000 patients [7, 8]. Prevalence of HAI in Southeast Asia is 9%, and between 2.5% and 14.8% in Africa [9, 10] whereas it is 7.6% in diverged patient populations in high-waged (high-income) countries [11].

Patients admitted in Intensive Care Units (ICUs) have a higher rate of prevalence of HAI. However, in certain situations, the frequency of patient contact may be higher to ensure 100% hand hygiene compliance among HCWs [12, 13]. An increased risk of HAIs is caused by invasive equipment often used on ICU patients, which serve as entry routes for virulent microbes [14].

The proper compliance with hand hygiene can decrease the spread of HAIs, length of stay in hospital, HAIs related mortality and morbidity, healthcare expenses, and encourages the patient's health and safety which have been proved by the various studies [15, 16]. 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

Characteristics	n	%
Age (years)		
20-25	82	39.23
26-30	77	36.84
31-35	43	20.57
36-40	6	2.87
41-45	1	0.47
Gender		
Male	74	35.4
Female	135	64.6
Marital Status		
Married	112	53.58
Unmarried	92	44.01
Divorced	5	2.39
Working Experience		
1-year	32	15.31
less than 1 year	22	10.52
more than 1 year	155	74.16
Education		
BSN	23	11
MBBS	45	21.53
CMW	19	9.09
Nursing Assistant	9	4.3
Diploma in Nursing	107	51.19
DPT	6	2.87
Designation		
Nurse	134	64.11
Healthcare assistant	10	4.78
Midwife	14	6.69
Doctor	43	20.574
Technician	2	0.95
Therapist	6	2.87

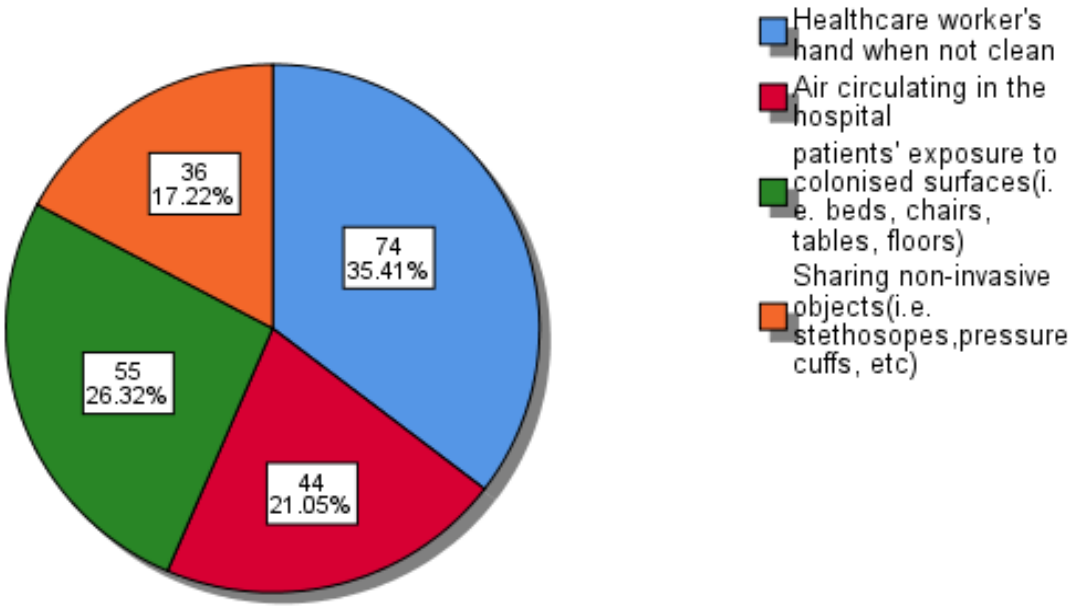

Fig. 1. Main route of cross transmission of potentially harmful germs between patients in health care facility

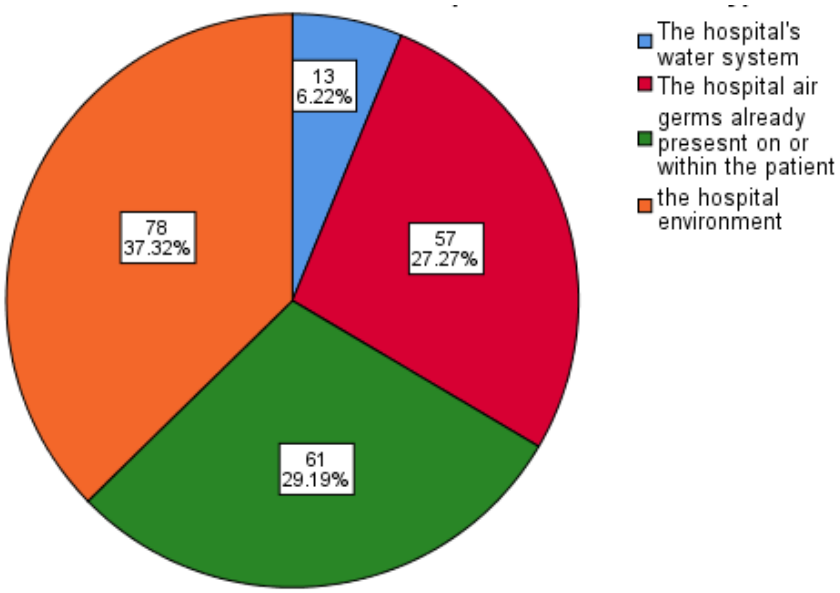

Fig. 2. The most frequent source of germs responsible for health care-associated infections

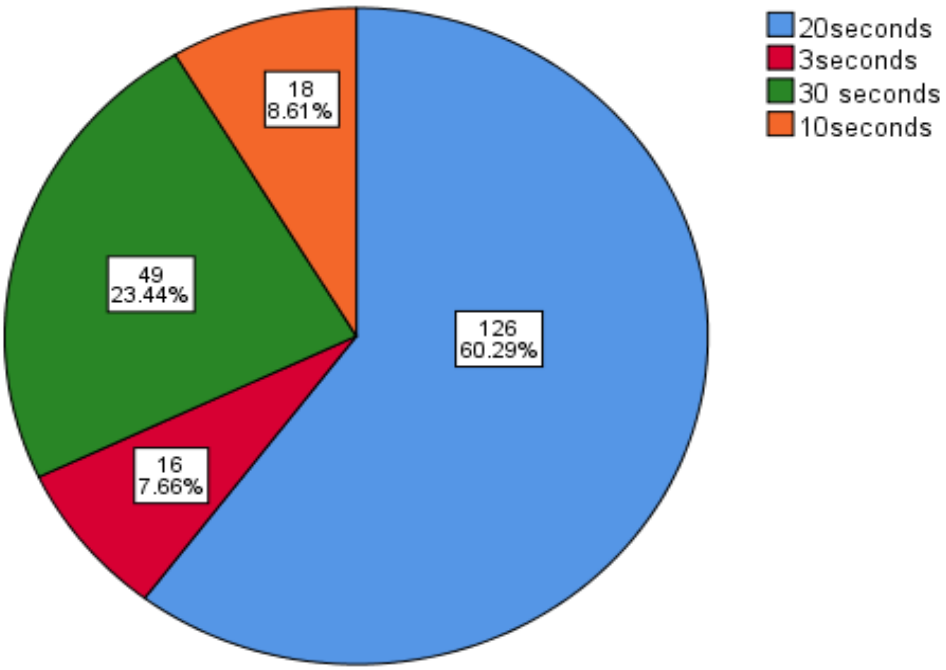

Fig. 3. Minimal time needed for alcohol-based hand rub to kill most germs on hands

Table 2. Hand hygiene practice questionnaire

Characteristics	N	%
Did you receive formal training in hand hygiene practice in the last three years?		
Yes	99	47.37
No	110	52.63
Do you routinely use an alcohol-based hand rub for hand hygiene?		
Yes	179	85.65
No	30	14.35

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 Alcohol-based hand rub and handwashing with soap and water is true immediately after a risk of body fluid exposure 99% participants said yes and only 1% 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

Characteristics	n	%
Hand hygiene before touching the patient prevents transmission of germs		
Yes	204	97.61
No	5	2.39
Hand hygiene Immediately after a risk of body fluid exposure prevents transmission of germs		
Yes	203	97.13

Characteristics	n	%
No	6	2.87
Hand hygiene Immediately before a clean/aseptic procedure prevents transmission of germs		
Yes	201	96.17
No	8	3.83
Hand hygiene after exposure to the immediate surroundings of a patient prevents transmission of germs		
Yes	209	100.00
No	0	0.00
Alcohol-based hand rub and handwashing with soap and water are true after touching a patient		
Yes	204	97.61
No	5	2.39
Alcohol-based hand rub and handwashing with soap and water are true immediately after a risk of body fluid exposure		
Yes	209	100
No	0	0
Alcohol-based hand rub and handwashing with soap and water are true after exposure to the immediate surroundings of a patient		
Yes	207	99.00
No	2	1.00
Hand rubbing is more rapid for hand cleansing than handwashing		
Yes	192	91.90
No	17	8.10
Hand rubbing causes skin dryness more than handwashing		
Yes	202	96.70
No	7	3.30
Wearing jewelry should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?		
Yes	201	96.17
No	8	3.83
Damaged skin should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?		
Yes	197	94.26
No	12	5.74
Artificial fingernails should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?		
Yes	180	86.12
No	29	13.88
Regular use of a hand cream should be avoided, as associated with increased likelihood of colonization of hands with harmful germs?		
Yes	110	52.63
No	99	47.37

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.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Pittet D. Improving adherence to hand hygiene practice: a multidisciplinary approach. Emerging Infectious Diseases. 2001;(2):234.
2. Pittet D. Improving adherence to hand hygiene practice: a multidisciplinary approach. Emerging Infectious Diseases. 2001;(2):234.
3. Mathur P. Hand hygiene: back to the basics of infection control. The Indian Journal of Medical Research. 2011;134(5):611.
4. Pittet D, Allegranzi B, Boyce J. World Health Organization World Alliance for Patient Safety First Global Patient Safety Challenge Core Group of Experts. The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. Infection Control & Hospital Epidemiology. 2009;(7):611-22.
5. Nejad SB, Allegranzi B, Syed SB, Ellis B, Pittet D. Health-care-associated infection in Africa: a systematic review. Bulletin of the World Health Organization. 2011;89:757-65.
6. Saleh AM, Alrawaili SM, Abdelbasset WK. Hand hygiene practices among Jordanian nurses in Amman. African Health Sciences. 2022;22(3):710-7.
7. Chen YC, Sheng WH, Wang JT, Chang SC, Lin HC, Tien KL, Hsu LY, Tsai KS. Effectiveness and limitations of hand hygiene promotion on decreasing healthcare–associated infections. PloS one. 2011;6(11):e27163.
8. Labrague LJ, McEnroe-Petitte DM, Van de Mortel T, Nasirudeen AM. A systematic review on hand hygiene knowledge and compliance in student nurses. International Nursing Review. 2018;(3):336-48.
9. Sands M, Aunger R. Determinants of hand hygiene compliance among nurses in US hospitals: A formative research study. PloS one. 2020;15(4):e0230573.
10. Gould DJ, Moralejo D, Drey N, Chudleigh JH, Taljaard M. Interventions to improve

hand hygiene compliance in patient care. Cochrane Database of Systematic Reviews. 2017;(9).

11. Ceylan B, Gunes U, Baran L, Ozturk H, Sahbudak G. Examining the hand hygiene beliefs and practices of nursing students and the effectiveness of their handwashing behaviour. Journal of Clinical Nursing. 2020;(21-22):4057-65.
12. Ng WK, Shaban RZ, van de Mortel T. The effect of a hand hygiene program featuring tailored religion-relevant interventions on healthcare workers' hand rubbing compliance and beliefs in the United Arab Emirates: A cohort study. Infection, disease and health. 2019;24(3):115-23.
13. Suchitra JB, Devi NL. Impact of education on knowledge, attitudes and practices among various categories of health care workers on nosocomial infections. Indian Journal of Medical Microbiology. 2007;25(3):181-7.
14. Randle J, Clarke M, Storr J. Hand hygiene compliance in healthcare workers. Journal of Hospital Infection. 2006;64(3):205-9.
15. Al-Hussami M, Darawad M, Almhairat II. Predictors of compliance handwashing practice among healthcare professionals. Healthcare Infection. 2011;16(2):79-84.
16. Biswal M, Angrup A, Rajpoot S, Kaur R, Kaur K, Kaur H, Dhaliwal N, Arora P, Gupta AK. Hand hygiene compliance of patients' family members in India: importance of educating the unofficial ‘fourth category’of healthcare personnel. Journal of Hospital Infection. 2020;104(4):425-9.
17. Biswal M, Angrup A, Rajpoot S, Kaur R, Kaur K, Kaur H, Dhaliwal N, Arora P, Gupta AK. Hand hygiene compliance of patients' family members in India: importance of educating the unofficial ‘fourth category’of healthcare personnel. Journal of Hospital Infection. 2020;104(4):425-9.
18. Randle J, Clarke M, Storr J. Hand hygiene compliance in healthcare workers. Journal of Hospital Infection. 2006;64(3):205-9.
19. Bharara T, Gur R, Duggal S, Chugh V. Evaluation of hand hygiene compliance over the years, in an intensive care unit of a north Delhi hospital preparing for accreditation: A 3-year study. Journal of Family Medicine and Primary Care. 2020;(4):1939.
20. Abalkhail A, Mahmud I, Alhumaydhi FA, Alslamah T, Alwashmi AS, Vinnakota D, Kabir R. Hand hygiene knowledge and perception among the healthcare workers during the COVID-19 pandemic in Qassim, Saudi Arabia: a cross-sectional survey. In Health Care. 2021;9(12):1627). MDPI.
21. Parmeggiani C, Abbate R, Marinelli P, Angelillo IF. Healthcare workers and health care-associated infections: knowledge, attitudes, and behavior in emergency departments in Italy. BMC infectious diseases. 2010;10(1):35
22. Jang JH, Wu S, Kirzner D, Moore C, Youssef G, Tong A. et al. Focus group study of hand hygiene practice among healthcare workers in a teaching hospital in Toronto, Canada. Infect Control Hosp Epidemiol. 2010;31(2):144–50

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. Demogrphical information

1. **Name**: _____ (optional)
2. **Age**
   a) 20-25
   b) 26-30
   c) 31-35
   d) 36-40
   e) 41-45
   f) 45-50

2. Gender

a. Male
b. Female

3. Marital status

a. Married
b. Un married
c. Divorced

4. Working experience

a. 1-year
b. Less than 1-year
c. More than 1-year

5. Education

a. BSN
b. MBBS
c. Midwifery
d. Nursing assistant
e. RN diploma

6. **Profession**
   a. Nurse
   b. Healthcare assistant
   c. Midwife
   d. Medical doctor
   e. Technician
   f. Therapist

7. 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 *<u>to the patient</u>*?

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

u. After making a patient's bed	☐ Rubbing	☐ Washing	☐ None
v. After visible exposure to blood	☐ Rubbing	☐ Washing	☐ None

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 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 1hour 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:

Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/94520