DOI: https://doi.org/10.53350/pjmhs211561198

ORIGINAL ARTICLE

Knowledge and Practice of Health-care Workers regarding Hand Hygiene during Third Wave of COVID-19 Pandemic

MINAHIL FATIMA[1], MUHAMMAD WAQAR[2], HUMA QAMAR[3], MUAAZ AKRAM[4], FATIMA ZIA[5], RAFIA HUSSAIN[6]
[1]*Demonstrator, Department of Anatomy, Institute: Central Park Medical College, Lahore*
[2]*Medical student, Institute: Shalamar Medical and Dental College, Lahore*
[3]*MPhil student anatomy, Institute: University of Health Sciences, Lahore*
[4]*Medical student, Shalamar Medical and Dental College, Lahore*
[6]*Postgraduate resident , Community Medicine, Lahore Medical and Dental College, Lahore*
Correspondence to Dr. Minahil Fatima, Email: fminahil02@gmail.com, Phone: 0332-7752959

ABSTRACT

Background: Iatrogenic and nosocomial infections are a serious threat to a healthcare setting especially during a pandemic. Hand hygiene among the health-care workers stands out to be a pivotal preventive measure. Practical application of hand hygiene measures during third wave of COVID-19 pandemic primarily depend upon the current knowledge among the health care workers.

Methods: A cross-sectional study design based on validated WHO questionnaire for hand hygiene among the health care workers was conducted during March till May2021 in the settings of Shalamar and Central Park hospital and medical colleges.

Results: The sample consisted of 271 participants with 110 males and 161 females, with the mean age of 24.72+ 4.174 years. The sample consisted of 36.2% of medical students, 49.1% of doctors and 14.8% of paramedical staff. Nearly 50.6% of the individuals claim to receive formal training. 47.6% believe that "Health-care workers' hands when not clean" are the main route of cross-transmission. Nearly 57.2% believed that the hospital environment (surfaces)the most frequent source of germs. Comparison of hand-rubbing and washing revealed that major percentage believe hand rub to be rapid however less effective causing dryness. A majority believe that hand hygiene before touching the patient, immediately after exposure to body fluids or immediate surroundings of patients prevents transmission of germs to the patient and vice versa afterwards prevents transmission to HCW.

Conclusion: A large proportion of the sample has considerable knowledge regarding essential hand hygiene in a health care setting. However more frequent training sessions should be conducted to improve it further.

Key words: Hand hygiene, Health-care workers, Knowledge

INTRODUCTION

Medical settings-associated infections are a serious problem in health care settings that may cause prolonged hospital stays or even high mortality where hands are the common vehicle of transmission of such infections.[1] Hand hygiene is a general term referring to any action of hand cleansing by using water and detergent or the use of alcohol-based hand sanitizer[2].

World health organization WHO guidelines on hand hygiene in Health Care settings provide health care workers with a thorough review of evidence on hand hygiene as well as specific guidelines and recommendations to improve practices and reduce transmission of microorganisms from patient to patient and patient to health care workers[3].

In December 2019, Covid 19 emerged [4]and later was declared as a pandemic on March 11, 2020 by WHO.[5] Total confirmed cases of COVID 19 in Pakistan have crossed 835 thousand and currently, we are going through the third wave of this pandemic[6]. While living in the middle of the pandemic, the need of maintaining hand hygiene among health care workers has become a necessity.

WHO has published advice that includes maintaining distance, wearing masks, and following handwashing guidelines entitled Hand Hygiene: Why, how, and when? So proper hand washing habits are need of the hour to break the chain of the spread of this deadly virus as it is one of the best preventive measures to protect ourselves from the risk of getting infected from coronavirus[7].

Covid-19 is a contagious respiratory illness that spreads through inhalation or ingestion of virus-laden droplets produced during coughing or sneezing. As this virus can also end up on various surfaces. One can transfer them onto their hands while touching those contaminated surfaces[8]. Medical personnel that come in contact with the covid affected patients have a high chance of contracting and spreading the virus. Coronavirus is an enveloped virus and the structural protein-E plays an important role in virus assembly and virus-host cell interaction[9]. Washing hands with soap destabilizes the attachment of the virus. So, it is of dire importance that all the health care professionals know proper handwashing techniques and wash their hands regularly following standard handwashing guidelines. By maintaining hand hygiene, this primary source of infection can be prevented.

Unfortunately, there are some pivotal shortcomings, major being the health care professionals themselves not following the WHO handwashing guidelines or not having proper knowledge about guidelines. To stop or slow down this uncontrollable viral spread, all health care professionals including doctors, paramedics as well as medical students should be acquainted with WHO handwashing guidelines and should follow them. It seems more crucial for medical students to learn and practice

Received on 13-05-2021
Accepted on 23-06-2021

proper handwashing techniques so they can be habituated during their learning phase and can follow them now as well as in the future while serving as medical professionals[10].

The aim of this study is to find out if health care professionals working in various tertiary care hospitals of Lahore are familiar with WHO guidelines on handwashing and also to find out if these guidelines are being implemented during the third wave of the Covid pandemic.

The objective of the study was to assess the knowledge and practice of health-care workers regarding hand hygiene during third wave of COVID-19 pandemic in a tertiary-care setting.

MATERIALS AND METHODS

The cross-sectional study design was used to assess knowledge and practices among the health-care workers including doctors, final year medical students and paramedical staff in the settings of Shalamar Hospital and affiliated Medical College and Central Park Teaching Hospital and affiliated Medical College which are both tertiary care hospitals in Lahore. The duration of study was 3 months after approval of synopsis from March 2021 till May 2021. A total of 271 participants were included in the study by using the non-probability convenience sampling technique. All male and female doctors and paramedical staff currently working in the hospitals and medical students of final year MBBS from both the colleges giving the consent to participate in the study, were included in the sample. A structured validated questionnaire was used to collect data. It consists of WHO "Hand Hygiene Knowledge Questionnaire for Health Care workers". Data was collected, after getting approval of ethical review board of Central Park Medical College, Lahore. Informed verbal consent was taken from the participants before data collection. Data coding, entry and, analysis was done using IBM SPSS version 23. Descriptive statistics were used to find the results, which are presented as tables, consisting of frequency distribution and percentages. Bar charts are made to display the results further. Chi-square test is applied to test the association between the socio-demographic variables and knowledge and practices.

RESULTS

A total of 350 individuals were asked to fill Performa, out of which 271 responded. Response rate was 77%. The sample consisted of 271 participants with 110 males (40.6%) and 161(59.4%) females, with the mean age of 24.72+ 4.174 years, ranging from 19 years to 63 years. The sample consisted of 36.2% of medical students 98(49.1%) of doctors (n=133) and 14.8% of paramedical staff (n=40). The department-wise distribution of the participants can be assessed by Table 1.

When inquired about the acquisition of any formal training in hand hygiene in last three years there was a half and half response. Nearly 50.6% of the individuals claim to receive formal training and 49.4% did not. A large majority of 77.9% claimed to routinely use alcohol hand-rub for hand hygiene yet 22.1% admitted not to routinely use the alcohol hand-rub. When asked about the main route of cross-transmission of potentially harmful germs between patients in a health-care, 47.6% believe that "Health-care workers' hands when not clean" while 33.9% believe "Patients' exposure to colonised surfaces (i.e., beds, chairs, tables, floors)", 10.3% believed "Sharing non-invasive objects (i.e., stethoscopes, pressure cuffs, etc.) between patients" and merely 8.1% believed "Air circulating in the hospital" was mainly responsible for the cross transmission.

Table 1: Department-wise distribution of the study participants.

Department	Frequency	%age
Medicine	87	32.1
Surgery	44	16.2
Obstetrics	10	3.7
Pediatrics	21	7.7
Emergency unit	13	4.8
ICU	15	5.5
Mixed medical and surgical	81	29.9

Moreover, when asked about the most frequent source of germs responsible for health care-associated infections, nearly 57.2% believed that the hospital environment (surfaces), whilst 26.2% believed "Germs are already present on or within the patient" and 8.1% believed that "hospital air system" and 8.1% believed that "water system" are the most frequent source of germs. Knowledge about the prevention can be assessed by table 2.

When asked about minimum time needed for alcohol-based handrub to kill most germs on your hands, nearly 59% responded 20 seconds, while the rest responded less than 20 seconds.

Table 2 shows the knowledge about the methods that should be used in special situations. When asked about the avoidance of certain objects and their used as associated with increased likelihood of colonization of hands with harmful germs,72.8% believed artificial finger nails should be avoided while 35.1% also believed regular use of hand cream should also be avoided. However, 75.6% believe wearing jewelry should be avoided and nearly 80.4% believe that damaged skin should be avoided as these are associated with colonization of hands with harmful germs.

The application of chi-square test revealed strong association at p=0.000 among gender and knowledge regarding type of hand hygiene method before giving an injection, where more (n=91) female believe hand washing is more adequate while more males (n=58) believe that hand rubbing is better. Moreover, there is a strong association of profession of the HCW and receiving of formal hand hygiene training in last 3 years at p=0.000 where 80% of the total included paramedical staff ,54% of the total doctors, 33% of the medical students claimed to receive formal training. Profession is also associated with use of alcohol rub for hand hygiene at p=0.002 where almost 92.5% of paramedical staff, 81.2% of the doctors and 67.3% of the medical students claim to use alcohol rub. Profession is also associated at p=0.029 with knowledge regarding the type of hand hygiene method before giving an injection.

Interestingly there is a strong association between the department of the HCW and the knowledge regarding the most common source of infection in a health care setting at p=0.002 where the knowledge is better amongst those from medicine and mixed medicine and surgical departments. It

is also significantly associated at p=0.019 with hand hygiene knowledge before touching the patient and at p=014 with knowledge regarding hand hygiene after exposure to body fluids. There also exists strong association between department and knowledge regarding hand hygiene and prevention of germs transmission to HCW (viz after touching the patient p=0.01, after exposure to immediate surroundings of the patient p=0.000) where those from medicine and mixed medicine and surgery had more knowledge. Department also has association with the believe that hand rubbing causes skin dryness as compared to hand washing at p=0.040 and the belief that hand rubbing and hand washing should be performed in a sequalae at p=0.039.

There is a strong association of p=0.009 between department and knowledge regarding method of hand hygiene after visible exposure to blood.

Table 2: Knowledge regarding prevention of infection by Hand hygiene

Question	Categories		Frequencies	%age
Which of the following hand hygiene actions prevents transmission of germs *to the patient*?	Before touching a patient	Yes	241	88.9%
		No	30	11.1%
	Immediately after a risk of body fluid exposure	Yes	216	79.7%
		No	55	20.3%
	After exposure to the immediate surroundings of a patient	Yes	200	73.8%
		No	71	26.2%
	Immediately before a clean/aseptic procedure	Yes	201	74.2%
		No	70	25.8%
Which of the following hand hygiene actions prevents transmission of germs *to the health-care worker*?	After touching a patient	Yes	239	88.2%
		No	32	11.8%
	Immediately after a risk of body fluid exposure	Yes	217	80.1%
		No	54	19.9%
	Immediately before a clean/aseptic procedure	Yes	190	70.1%
		No	81	29.9%
	After exposure to the immediate surroundings of a patient	Yes	196	72.3%
		No	75	27.7%

Table 3: Knowledge about alcohol-based hand-rub and handwashing.

Which of the following statements on alcohol-based hand-rub and handwashing with soap and water are true?				
Statement	**True**		**False**	
	Frequency	**%age**	**Frequency**	**%age**
Hand rubbing is more rapid for hand cleansing than handwashing	202	74.5%	69	25.5%
Hand rubbing causes skin dryness more than handwashing	197	72.7%	74	27.3%
Hand rubbing is more effective against germs than handwashing	98	36.2%	173	63.8%
Hand washing and hand rubbing are recommended to be performed in sequence	180	66.4%	91	33.6%

Table 4: Knowledge about type of hand hygiene method is required in specific situations.

Which type of hand hygiene method is required in the following situations?			
Situation	**Rubbing**	**Washing**	**None**
Before palpation of the abdomen	171(63.1%)	90(33.2%)	10(03.7%)
Before giving an injection	124(45.8%)	128(47.2%)	19(07%)
After emptying a bedpan	38(14%)	226(83.4%)	07(2.6%)
After removing examination gloves	80(29.5%)	174(64.2%)	17(6.3%)
After making a patient's bed	80(29.5%)	183(67.5%)	08(03%)
After visible exposure to blood	37(13.7%)	232(85.6%)	02(0.7%)

DISCUSSION

Hand hygiene (HH) before and after each contact with any patient is simple, easily implemented and an effective practice to prevent hospital-acquired infections. Educating health care workers (HCW) on effective HH techniques and compliance is highly important.

Formal training is of utmost importance. Among those who responded in our study, only 50.6% of them received any formal training in hand hygiene in the past three years. 80% of them were nurses, 54% were doctors and only 33% were medical students. Similar studies in India and Saudi Arabia showed 79% and 74% of HCWs received formal training respectively[11]. In my opinion the reason of this comparatively low rate is attributed to lack of frequent training sessions and minimal interest of audience towards these workshops in our setting.

While answering about routinely use of ABHR, 77.9% of participants in our study claimed routine use of alcohol-based hand rubs which shows different results with a study previously held in Karachi where compliance of HCWs with hand disinfectants use before and after every patient contact was only 12.3%, however, the percentage of individuals received formal training was almost same 55.25%[12]. This showed compliance of HCWs with ABHR has massively increased during COVID pandemic. Another similar study on undergraduates in India in 2017 showed a formal training rate of 43% and 71.9% of students claimed using alcohol-based rubs regularly[13].

In our study, almost half of the participants 47.6% answered that unclean hands of health care workers are the most important source of cross-transmission of germs among patients in health care settings. 59.2% of the participants in the Saudi Arabian study gave a similar

answer[12]. Only 26.2% of the individuals of our study believed that germs already present on or within the patient are the frequent source of germs responsible for healthcare-associated infections, rest of the participants gave an incorrect answer and among them most common answer was hospital environment as a source of these infections. The correct ratio of this answer was almost the same in Saudi Arabian and Indian study that was 26.4% and 27% respectively[11,13]. In my opinion, poor literature knowledge and lack of standard guidelines are the reason of high percentage of incorrect answers in all of the three settings.

Following percentages of individuals believed that hand hygiene is important before touching a patient: 88.9%, after body fluid exposure: 80%, after exposure to patient's surroundings: 73%, immediately before aseptic procedures: 74%, to prevent cross-transmission of germs among patients as well as their transmission to HCWs. In an Irish study of 2018, hand hygiene compliance was highest after body fluid exposure (99.5% among nursing students, 91% medical students) and lowest after touching patients (61.5% Nursing Students, 57.5% Medical Students)[14]. However, hand hygiene is equally important in all the above-mentioned situations.

To know about proper method and time required to perform proper HH is significantly important as well. In our study, only 59% of participants knew that minimum time needed for ABHR to kill most of the germs on hands is 20 seconds while other answered less than 20 seconds. The results of Saudi and Indian studies were 54.8% and 36.1% respectively[12,14]. Insufficient time to perform hand hygiene due to high work load is one of the factors involved in poor compliance to HH in HCWs[15].

In this study, 74.5% of individuals responded that hand rubbing is more rapid for hand cleansing than hand washing. Lack of knowledge was seen when 72.7% had a misconception that ABHR causes skin dryness more than handwashing and only 36.2% believed that hand rubbing is more effective than handwashing. According to WHO guidelines, alcohol-based formulations should be preferred for routine hygiene disinfection, if the hands are not visibly dirty or contaminated with blood or other body fluids, as compared to handwashing with soap and water, it is not only more rapid and effective but also better tolerated by hands[7].

Results showed that participants preferred handwashing more than hand rubbing in situations that usually do not require handwashing according to WHO guidelines. Adverse effects of repetitive handwashing like dryness and irritation cause non-compliance to HH and can be avoided by giving awareness about the use of ABHR as an alternative that is less time consuming, efficient, and have fewer adverse effects[16]. Most of the HCW were familiar with the fact that artificial nails, jewelry, and damaged skin should be avoided to prevent the colonization of hands with harmful germs in the health care setting.

Overall, our study showed moderately satisfactory knowledge and practices among HCWs which is almost similar to a study published in 2018 held on medical undergraduates of Pakistan[17]. Another study in same region showed similar results having 68% combined score in all three domains (knowledge, attitude and practice) indicating moderate awareness[18]. The transmission of Health-setting associated infections can be interposed and results can be improved by providing hand hygiene resources at critical locations as well as behavior changes must be supported through education, training, monitoring feedback, and organizational support[19].

CONCLUSIONS

A large proportion of the sample has considerable knowledge regarding essential hand hygiene in a health care setting and compliance with ABHR has significantly improved during pandemic. However, more frequent training sessions should be conducted to improve it further.
Limitations and suggestions: Sample size is small so there is less generalizability. It is suggested that if the resources allow then all the health care workers should be included in the sample including nurses, phlebotomists, laboratory and x-ray technicians for future studies.
Conflict of interest: None

REFERENCES

1. Allegranzi B, Nejad SB, Combescure C, Graafmans W, Attar H, Donaldson L, Pittet D. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. The Lancet. 2011 Jan 15;377(9761):228-41.
2. Nabavi M, Alavi-Moghaddam M, Gachkar L, Moeinian M. Knowledge, attitudes, and practices study on hand hygiene among Imam Hossein Hospital's residents in 2013. Iranian Red Crescent Medical Journal. 2015 Oct;17(10).
3. Pittet D, Allegranzi B, Boyce J. The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. Infection control and hospital epidemiology. 2009;30(7):611-22.
4. Wang C, Horby P, Hayden F, Gao G. A novel coronavirus outbreak of global health concern. The Lancet. 2020;395(10223):470-473
5. WHO Director-General's opening remarks at the media briefing on COVID-19 - 11 March 2020 [Internet]. Who.int. 2020 [cited 10 December 2020]. Available from: https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020 https://coronavirus.jhu.edu/map.html
6. World Health Organization. *Hand Hygiene: Why, How & When? [Internet]* Geneva (Switzerland): World Health Organization; 2009. [2020 Jul 22;]. https://www.who.int/gpsc/5may/Hand_Hygiene_Why_How_and_When_Brochure.pdf Available from: [Google Scholar] https://www.who.int/emergencies/diseases/novel-coronavirus-2019/question-and-answers-hub/q-a-detail/coronavirus-disease-covid-19-how-is-it-transmitted
7. Boopathi S, Poma AB, Kolandaivel P. Novel 2019 coronavirus structure, mechanism of action, antiviral drug promises and rule out against its treatment. Journal of Biomolecular Structure and Dynamics. 2020 Apr 29:1-0.
8. Khadka A, Dani S. Washing Hands according to the WHO Guideline since the COVID-19 Outbreak in the Context of Medical Undergraduates at a Tertiary Care Center: A Descriptive Cross-sectional Study. Journal of the Nepal Medical Association. 2020 Dec 1;58(232).
9. Mahfouz AA, Abolyazid A, Al-Musa HM, Awadallah NJ, Faraheen A, Khalil S, El-Gamal MN, Al-Musa KM. Hand hygiene knowledge of primary health care workers in Abha

city, South Western Saudi Arabia. Journal of family medicine and primary care. 2017 Jan;6(1):136.
10. Ahmed J, Malik F, Memon ZA, Arif TB, Ali A, Nasim S, Ahmad J, Khan MA. Compliance and knowledge of healthcare workers regarding hand hygiene and use of disinfectants: a study based in Karachi. Cureus. 2020 Feb;12(2).
11. Modi PD, Kumar P, Solanki R, Modi J, Chandramani S, Gill N. Hand Hygiene Practices Among Indian Medical Undergraduates: A Questionnaire-Based Survey. Cureus. 2017 Jul 12;9(7):e1463. doi: 10.7759/cureus.1463. PMID: 28936375; PMCID: PMC5595270.
12. Kingston LM, O'Connell NH, Dunne CP. A comparative study of hand hygiene and alcohol-based hand rub use among Irish nursing and medical students. Nurse Educ Today. 2018 Apr;63:112-118. doi: 10.1016/j.nedt.2018.01.022. Epub 2018 Jan 31. PMID: 29432997
13. Al Ghafari Z, AbuRuz ME: Hand hygiene knowledge, attitude and barriers among Jordanian nurses. Int Med J. 2019, 24:385-400.
14. Hugonnet S, Perneger TV, Pittet D: Alcohol-based handrub improves compliance with hand hygiene in intensive care units. Arch Intern Med. 2002, 162:1037-1043. 10.1001/archinte.162.9.1037
15. Qasmi SA, Mahmood Shah SM, Wakil HYI, Pirzada S. Guiding hand hygiene interventions among future healthcare workers: implications of knowledge, attitudes, and social influences. Am J Infect Control. 2018 Sep;46(9):1026-1031. doi: 10.1016/j.ajic.2018.02.019. Epub 2018 Apr 9. PMID: 29650489.
16. Bari A, Imran I, Nawaz NA, Kamran R, Bano I, Sadaqat N. Perspective of health professionals on hand hygiene in a tertiary care center in Pakistan. J Pak Med Assoc. 2021 Jan;71(1(A)):110-113. doi: 10.47391/JPMA.532. PMID: 33484532
17. Afzal MF, Hamid MH, Parveen A, Hanif A. Educational intervention to improve the knowledge of hand hygiene in pediatric residents and nurses. Pak J Med Sci. 2019;35(3):771-774. doi: https://doi.org/10.12669/pjms.35.3.388