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Original Article

Ophthalmology Section

Knowledge of Hand Hygiene among Ophthalmologists in Northern India: A Cross-sectional Survey

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ABSTRACT

Introduction: Hands of healthcare workers act as the most common vehicle for the transmission of healthcare associated infections (HCAI). A good practice of hand hygiene reduces the incidence of these nosocomial infections. There is a dearth of precise data about the awareness of hand hygiene practice amongst Ophthalmologists in India.

Aim: To assess the knowledge of hand hygiene amongst the Ophthalmologists and trainees in Uttarakhand and surrounding regions of Northern India.

Materials and Methods: This cross-sectional study was conducted by Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India amongst Ophthalmologists attending a three days long annual ophthalmology conference in Uttarakhand in October 2019, after taking due approval from the Ethics Committee of the Institute. All the 150 participants who were included in the study filled the World Health Organisation (WHO) hand hygiene questionnaire, comprising of 10 multiple-choice questions. The respondents were asked to tick the most appropriate choices and scores were given out of a maximum score of 25. Mann-Whitney test was used for statistical analysis in the study.

Results: A total of 150 subjects participated in the survey, among which 70 were females and 80 were males. Of all, 90 (60%) of the participants were practicing surgeons, while 60 (40%) were postgraduate students. About 126 (84%) reported having received a formal training on hand hygiene. Hands of the healthcare workers were reported to be the commonest route of cross transmission of germs between the patients and healthcare facilities. The average total score of the participants in the survey was 16 (64%) and there was no significant difference between the scores of participants based on gender and training.

Conclusion: The study shows that majority of the Ophthalmologists have formal training and fair knowledge on the basics of hand hygiene, but lacked an in-depth knowledge, which needs to be addressed in order to reduce the incidence of hospital acquired infections.

Keywords: Coronavirus disease 2019, Healthcare workers, Nosocomial infections, Pandemic, World health organisation

INTRODUCTION

Hand hygiene maintenance is a simple and effective way to prevent infections. Although simple, but due to lack of compliance among healthcare providers, its implementation is problematic worldwide [1]. On a random day, one out of 31 hospital patients have a Healthcare Associated Infection (HCAI) [2]. Faulty hand hygiene practices have been detected in most of the healthcare settings [3]. In the present situation of Coronavirus Disease 2019 (COVID-19) pandemic, the practice of hand hygiene has emerged as the most important, cost-effective and easy way to prevent the chain of transmission from spreading. This is because these viruses spread effectively by human to human contact and remain stable on surfaces for days [4].

The HCAI due to poor hand hygiene has posed a major threat to the safety of the patients, and prevention of these infections should be the prime concern to make the healthcare system safe for the patients and the caregiver. The hand of a Healthcare Worker (HCW) is the most common vehicle for the transmission of HCAI. The microorganisms remain for variable periods on the hands of an HCW and act as vehicles of cross transmission of pathogens [5]. To reduce the load of infection transferred by the hands of HCW to the patients, the World Health Organisation (WHO) introduced "My Five Moments for Hand Hygiene" [6]. In the past, several studies have shown that good practice of hand hygiene reduces the incidence of nosocomial infections [7,8]. There is a lack of precise data especially in North India, on the knowledge of hand hygiene practice amongst Ophthalmologists. With the development of a new era of the National Accreditation Board for Hospitals and Healthcare Providers (NABH), India has yet to collect information about hand hygiene knowledge data. Therefore, this questionnaire-based analysis was conducted to assess the knowledge regarding hand hygiene amongst Ophthalmologists of North India.

MATERIALS AND METHODS

This cross-sectional, questionnaire-based survey was conducted by Himalayan Institute of Medical Sciences, Dehradun, Uttarakhand, India amongst Ophthalmologists attending a three-day-long annual conference in Uttarakhand, in October 2019, after taking due approval from the Ethics Committee of the institute (RC2020/82). Sample size was calculated using convenient sampling method and data collection of the study population was done using complete enumeration.

Inclusion criteria: All the participants who agreed to participate in the survey were included in the survey.

Exclusion criteria: Participants who refused were excluded from the survey.

Study Procedure

After obtaining the consent, all the 150 delegates were requested at the registration counter, to fill the printed WHO's hand hygiene questionnaire [9]. The participants were given the questionnaire comprising of 10 multiple choice questions [Table/Fig-1]. Each question had multiple options and respondents were asked to tick the best suited choices. All the forms were analysed by the authors and participants were given scores based on the number of correct answers. Participants were given score of '1' for each correct answer and '0' for a wrong answer. Total scores were then further analysed. For the participants who had attended training session on hand hygiene in the past, Mann-Whitney test was used to analyse the impact of training on hand hygiene by comparing the participants who received and who did not receive formal training on hand hygiene practices.

S. No.	Questions	Responses	Number of respondents (n=150)
1	Did you receive formal training in hand hygiene in the last three years?	Yes No	126 (84%) 24 (16%)
2	Which of the following is the main route of cross-transmission of potentially harmful germs between patients in a healthcare facility?	a. HCW's hand when not clean b. Circulating air in the hospital c. Patient's exposure to colonised surface	107 (71.3%) 18 (12.0%) 25 (16.7%)
3	What is the most frequent source of germs responsible for HCAI?	a. Hospital water system b. Hospital air c. Germs present on and within the patient d. Hospital environment (surfaces)	19 (12.7%) 23 (15.3%) 73 (48.7%) 35 (23.3%)
4	What is the minimal time needed for alcohol-based handrub to kill germs?	20 seconds 3 seconds 1 minute 10 seconds	98 (65.3%) 2 (1.3%) 36 (24.0%) 14 (9.3%)
5	Which of the following statements on alcohol-based handrub and handwashing with soap and water are true?		
	Hand rubbing is more rapid for hand cleansing than handwashing	a. True b. False	149 (99.3%) 1 (0.7%)
	Hand rubbing causes skin dryness more than handwashing	a. True b. False	131 (87.3%) 19 (12.7%)
	Hand rubbing is more effective against germs than handwashing	a. True b. False	29 (19.3%) 121 (80.7%)
	Handwashing and hand rubbing are recommended to be performed in sequence	a. True b. False	67 (44.7%) 83 (55.3%)
6	Which of the following hand hygiene actions prevents transmission of germs to the patient?		
	Before touching a patient	a. Yes b. No	135 (90%) 15 (10%)
	Immediately after a risk of body fluid exposure	a. Yes b. No	131 (87.3%) 19 (12.7%)
	After exposure to immediate surroundings of a patient	a. Yes b. No	116 (77.3%) 34 (22.7%)
	Immediately before a clean/aseptic procedure	a. Yes b. No	111 (74%) 39 (26%)
7	Which of the following hand hygiene actions prevent transmission of germs to the HCW?		
	After touching a patient	a. Yes b. No	139 (92.7%) 11 (7.3%)
	Immediately after a risk of body fluid exposure	a. Yes b. No	138 (92%) 12 (8%)
	Immediately before clean/aseptic procedure	a. Yes b. No	118 (78.7%) 32 (21.3%)
	After exposure to the immediate surroundings of a patient	a. Yes b. No	127 (84.6%) 23 (15.3%)
8	Which type of hand hygiene method is required in the following situations?		
	Before palpation	a. Rubbing b. Washing c. None	136 (90.7%) 13 (8.7%) 1 (0.7%)
	Before giving injection	a. Rubbing b. Washing c. None	94 (62.7%) 55 (36.6%) 1 (0.7%)
	After emptying a bedpan	a. Rubbing b. Washing c. None	27 (18%) 123 (82%) 0
	After removing examination gloves	a. Rubbing b. Washing c. None	71 (47.3%) 78 (52.0%) 1 (0.7%)
	After making a patient's bed	a. Rubbing b. Washing c. None	33 (22.0%) 117 (78.0%) 0
	After visible exposure to blood	a. Rubbing b. Washing c. None	16 (10.7%) 134 (89.3%) 0
9	Which of the following should be avoided, as it is associated with increased likelihood of colonisation of hands with harmful germs?		
	Wearing jewellery	a. Yes b. No	131 (87.3%) 19 (12.7%)
	Damaged skin	a. Yes b. No	147 (98%) 3 (2.0%)
	Artificial fingernails	a. Yes b. No	150 (100%) 0
	Regular use of hand cream	a. Yes b. No	106 (70.7%) 44 (29.3%)
10	Do you routinely use an alcohol-based handrub for hand hygiene?	a. Yes b. No	147 (98%) 3 (2%)

[Table/Fig-1]: WHO Questionnaire [9].

STATISTICAL ANALYSIS

Data were initially entered into an Excel spreadsheet and then analysed by the Statistical Package for the Social Sciences, version 22 software (SPSS). Mann-Whitney test was used to compare the results of participants based on gender and training.

RESULTS

Around 200 participants were approached in three days of the conference, of which, 150 (70 females and 80 males) participated in the survey. The response rate was 75% (n=150). A total of 87 (58%) participants were from the Uttarakhand region while 63 (42%) belonged to other states including Uttar Pradesh, Himachal Pradesh, Haryana, Delhi, and Punjab. The majority of participants were postgraduate students in ophthalmology 60 (40%); 55 (36.7%) had experience of fewer than five years, 17 (11.3%) had experience between 5-10 years, 17 (11.3%) had experience between 10-15 years, and 1 (0.7%) had experience of more than 15 years.

On enquiring about the main route of cross-transmission of the germs between patients and the healthcare facility, 107 (71.3%) of the participants agreed that the hands of the HCW were the main route, followed by the patient's exposure to a colonised surface 25 (16.7%), and the air circulating in the hospital 18 (12%). The most frequent source of germs responsible for HCAI, was the hospital environment for 35 (23.3%) of the participants, hospital air for 23 (15.3%), and hospital water system for 19 (12.7%). Less than half of all the respondents 73 (48.7%) knew that germs present on or within the patient is the main source of HCAI. A total of 149 (99.3%) agreed that while hand rubbing is a more rapid method of hand hygiene, hand rubbing is more effective against the germs than handwashing 29 (19.3%). Of all, 131 (87.3%) of the respondents, associated hand rubbing with skin dryness. When asked about whether handwashing or hand rubbing is recommended to be performed in sequence or not, the participants seemed to be almost equally divided, but 83 (55.3%) agreed to the fact that it is not recommended. A majority 98 (65.3%) of the participants knew that the correct time required for the alcohol-based handrub to act on germs was 20 seconds; the rest of them seemed unaware regarding the actual time of its action.

Of all, 147 (98%) of the respondents used alcohol-based handrub regularly, while the rest of them did not use any handrub in their routine practice. Most of the participants in the present survey agreed that the practice of hand hygiene before touching the patient 135 (90%), immediately after exposure to body fluids 131 (87.3%), and immediately before performing an aseptic procedure 111 (74%) would help in preventing the transmission of germs to the patient. But the majority of the participants 116 (77.3%) responded incorrectly that performing hand hygiene after exposure to the immediate surroundings of a patient will also prevent transmission of germs to the patient which on the contrary, prevents infection to HCW and cross-infections among patients. On enquiring about "My Five Moments for Hand Hygiene", which prevent transmission of germs to HCW, majority of them knew that it should be performed after touching the patient 139 (92.7%), after the risk of exposure to body fluids 138 (92%), and after exposure to the immediate surroundings of the patient 127 (84.7%). Only 32 (21.3%) knew that hand hygiene before performing an aseptic procedure does not prevent germ transmission to HCWs. Most of them considered that hand rubbing is the correct method of hand hygiene before palpating a patient 136 (90.7%) and giving an injection 94 (62.7%), whereas handwashing is required in instances such as emptying a bedpan 123 (82%), after removing examination gloves 78 (52%), and after visible exposure to blood 134 (89.3%). Only 33 (22%) of the participants answered correctly that hand rubbing is the method of choice, which should be practiced after making a patient's bed. Almost half 59/126 (46.8%) of the trained people did not know the correct method of hand hygiene in different situations as only 59 of total 126 Ophthalmologists who underwent training in hand hygiene correctly answered all the questions on hand hygiene as given in question no. 8, in Table/Fig-1. A majority of the participants agreed that wearing jewellery 131 (87.3%), damaged skin 147 (98%), and artificial fingernails 150 (100%), increase the likelihood of colonisation of hands with harmful agents but only 44 (29.3%) participants knew that use of hand creams does not increase such a chance.

The average total score of the participants in the survey was 16 (64%), (mean 16.83, standard deviation 2.551), the lowest score being 11 (44%) and the highest was 21 (84%). There was no significant difference between the scores of participants based on gender and training [Table/Fig-2,3].

Score	Gender	N	Mean rank	p-value
Total (25)	Males	80	71.91	0.275
	Females	70	79.60	
	Total	150		

[Table/Fig-2]: Comparison of scores based on gender.
*Mann-Whitney test

Score	Training	N	Mean rank	p-value
Total (25)	Trained	126	76.94	0.346
	Untrained	24	67.92	
	Total	150		

[Table/Fig-3]: Comparison of scores based on training.
*Mann-Whitney test

DISCUSSION

Hand hygiene is the most important and simple tool for preventing HCAIs; still compliance with hand hygiene among HCWs is very low. There may be several reasons of poor hand hygiene compliance among HCWs, but the topic is rarely studied. It has been already established in studies that as high as 50% of the HCAIs are due to the healthcare providers [10]. The prevalence of such infections in developing countries is around 19% [11]. This has resulted in long-term disabilities; prolonged hospital stays, and raised healthcare costs [12]. Therefore, the practice of hand hygiene at the appropriate time and moment is the most effective and the easiest way to reduce these nosocomial infections [13].

The present study is unique as this was the first survey on hand hygiene involving the Ophthalmologists, who are not precluded from dealing with HCAIs, routinely in Operation Theatre (OT) and Outpatient Department (OPD), and were at greater risk of infections including COVID-19 due to close contact with the patient. There has been no baseline data on the awareness of Ophthalmologists on the topic so far. The study uses WHO questionnaire for assessment which is a detailed one and has been used in several other hand hygiene studies as a standard questionnaire. The topic of hand hygiene becomes more relevant in the ongoing era of the COVID-19 pandemic. It will help us to analyse where we are lacking in hand hygiene as surgeons and which aspects need to be focused on. Moreover, majority of the participants had formal training in hand hygiene and so, it was interesting to know how aware they were after taking the basic training on the subject.

As the knowledge of the participants regarding hand hygiene was assessed, it was noted that most participants answered the questions on HCAIs correctly but did not perform well when asked in detail about the sequence of handwashing and rubbing, time required for alcohol-based handrub to act etc. This implies that a majority of them had superficial knowledge but lacked in-depth knowledge of hand hygiene to be followed in day-to-day hospital routine. Almost half of the participants were found to be unaware of the correct sequence of hand hygiene and the time required for alcohol-based handrub to act. Studies from Nigeria and the United Kingdom depict a similar trend regarding the superficial knowledge amongst HCW on hand hygiene [12,13]. On the other hand, a study from Iran showed that participants were moderately knowledgeable on the topic of hand hygiene [10]. The knowledge of hand hygiene among HCWs could be improved if it is taught in the routine curriculum and regular assessments are

done. For the majority of the participants, hand rubbing caused skin dryness more than handwashing. Dryness of hands could be one of the constraints for compliance with hand hygiene and should be addressed by providing moisturisers at every place in the healthcare facility along with handrubs and soaps. A majority of the participants in the present study knew the various situations where they needed to perform hand hygiene in order to prevent HCAI. These results matched with a similar study from India, where most of the participants correctly answered when they should perform hand hygiene [14]. Institutions should make sure that the staff are aware of the occasions when to perform hand hygiene. For this, sign boards and charts could be used in the wards and corridors, and time-to-time meetings and trainings should be conducted so as to ensure that the staff are well updated.

On comparing the scores of Ophthalmologists who attended hand hygiene training at least once in the past with those who never attended the training, it was found that there was no significant difference between the two groups (p=0.346). Similarly, no significant difference between the scores of males and females was found (p=0.275). Despite the majority having received formal hand hygiene training, not even a quarter of the Ophthalmologists (15%) in the survey scored 80% or more, which is alarming since quality control bodies like NABH and WHO advise 100% compliance to guidelines [15]. This points to the fact that there is a gap in the knowledge of hand hygiene. There could be several reasons for the same such, as lack of time in the busy OPDs and Inpatient Departments (IPDs), lack of proper infrastructure and resources, forgetting, or not knowing when to perform hand hygiene as per guidelines. This needs to be addressed by the healthcare administrators and the infection control teams of all the healthcare facilities and furthermore, institutes must perform regular assessments and surveillance of hand hygiene so that training programmes are more practice-oriented rather than knowledge-oriented. In the past, other studies have also reported that the participants failed to follow proper hand hygiene practices even after attending training sessions [16]. This points to the fact that a single training session is not enough and the hospital staff need to attend time-to-time revision sessions, tests and seminars for the same. Also, the training should focus more on the practice aspect of hand hygiene. In addition, supervisors could be appointed to ensure adherence to hand hygiene practices.

At the present setup, Medical Colleges and associated government Community Health Centres (CHC) use visual signboards of hand hygiene steps at all relevant places like OT, OPD and wards to sensitise the staff, and regular classes and drills are undertaken to enforce hand hygiene amongst the staff. Now, the use of alcohol-based handrub has been accepted as the best way of preventing HCAIs globally. Moreover, WHO also recommends multimodal behaviour change strategy, which includes change in the system, education, feedback of the performance of HCWs and reminders at workplaces [17]. Thus, hand hygiene is a life-saving step in preventing nosocomial infections in today's era and we need to strive hard to achieve cent percent compliance amongst HCWs.

Limitation(s)

The limitations of the study were the small sample size, as well as the fact that the questionnaire did not explore the quality of training each clinician had undergone. Also, there is a need to assess other staff involved with patients in the Ophthalmology Department like nurses, OT technicians, and residents, so that effective measures are taken for improving hand hygiene and decrease the incidence of HCAIs in the Ophthalmology Department.

CONCLUSION(S)

The study shows that majority of the Ophthalmologists have formal training and fair knowledge of the basics of hand hygiene, but lacked the in-depth knowledge, which needs to be addressed in order to reduce the incidence of HCAIs.

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