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A cross sectional study to assess the knowledge regarding hand hygiene among undergraduate medical students in Konkan, Maharashtra, India

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ABSTRACT

Background

Hands are the principal route of hospital acquired infections and proper hand hygiene can significantly reduce the risk of hospital acquired infections. Hand hygiene has also been recognized as an important public health measure in current pandemic of COVID 19. Therefore, this study was carried out to assess the knowledge regarding hand hygiene among undergraduate medical students who are the healthcare providers of future.

Methods

A cross-sectional study was carried out among undergraduate medical students of 3rd year MBBS in a private medical college. The convenient sampling method was adopted for selection of students. The data was collected through email using "WHO hand hygiene knowledge questionnaire for health care workers". The collected data was analyzed with descriptive and inferential statistics using PRISM 8.0 trial version.

Results

Among the 82 study participants, 48 students had received formal training in hand hygiene in the last three years. Students had good knowledge of hand hygiene. The significant association was observed between receipt of formal training and hand hygiene knowledge in few aspects related to transmission of germs between the patient and health care workers.

Conclusion

Students showed overall good knowledge of hand hygiene and those who had received formal training earlier showed better knowledge in few aspects related to transmission of germs between the patient and health care workers. Incorporation of proper training program on hand hygiene is required in the undergraduate medical teaching to generate awareness and prevent health care associated infections.

Keywords: Hand Hygiene, Hand Washing, Hand Rubbing, Knowledge, Formal Training

INTRODUCTION

According to World Health Organization (WHO) hand hygiene is defined as any method that removes or destroys microorganisms on hands. It is well documented that the most important measure for preventing the spread of pathogens is effective hand washing. Hand hygiene is the action of cleansing hands, using water and detergent or the use of alcohol-based hand sanitizers for the removal of microorganisms from the hands.[1] The problems associated with improper hand hygiene among health care workers are patient safety, long stay in the hospital, health care expenditure, resistance to antibiotics, and also increased mortality. The guidelines on hand hygiene issued by WHO is one of the cost-effective measures to prevent such problems.[2]

Hand washing in health care setting to prevent infections was adopted as a result of studies by Holmes and Semmelweis in which they concluded that reason for puerperal fever was infection spread

by microorganisms present on healthcare workers hands.[3] Hands are the most common vehicle for the transmission of organisms and hand hygiene is the most powerful weapon against microorganisms.[4] Contaminated hands of health care workers is the main reason for transmission of infections which causes around 7-10% of morbidity and mortality among hospital admissions.[5] Although hand hygiene is one of the crucial factors, it is not well recognized by health care workers.[6] Awareness on hand hygiene practices among health care workers is less as shown in many studies.[7] Medical and nursing students are exposed to hospital acquired infections during their training and it is necessary that they should be aware of hand hygiene.[8] The observance of hand hygiene by medical students is reported as being weak.[9,10]

To improve the situation, continuous efforts are being made to identify effective and sustainable strategies. Introduction of an evidence-based concept of "My five moments for hand hygiene" by World Health Organization has helped to address the problem to good extent. These five moments that call for the use of hand hygiene include the moment before touching a patient, before performing aseptic and clean procedures, after being at risk of exposure to body fluids, after touching a patient, and after touching patient surroundings. This concept has been effectively used to improve understanding, training, monitoring, and reporting hand hygiene among healthcare workers.[11] Hand hygiene is necessary not only to prevent infection; but also, the simple action can enhance patient safety.[10]

Studies on burden of hospital acquired infections are more but the studies exploring the knowledge among health care professionals on hand hygiene are less.[12] Hence, we the investigators were interested to conduct a study to assess the knowledge of health care profession students towards hand hygiene and to find association between formal training and knowledge of hand hygiene; so that appropriate measures can be taken to promote hand washing compliance.

METHOD AND MATERIALS

The cross-sectional study was conducted in a private medical college of Konkan region of Maharashtra over a period of two months from May 2020 to June 2020 after obtaining necessary approval from the institutional ethics committee.

The convenient sampling method was adopted and 100 students of 3rd year MBBS were selected for the study after taking informed consent. In view of the lockdown imposed by government authorities for control of COVID-19 pandemic and online teaching method adopted by the college during that period; the "WHO hand hygiene knowledge questionnaire for health care workers" was sent by email to students on 05th May 2020 i.e. on the ~~eve of~~ World Hand Hygiene Day for assessment of their knowledge on hand hygiene. The questionnaire consists of 25 questions which had answers as "yes", "no", "true" and "false". Four students who did not send answers by email even after reminder were excluded from the study. The incompletely filled questionnaires of 14 students were not taken for analysis. So a total of 82 medical students who filled the questionnaire completely were included in the study.

Data was entered in Microsoft Office Excel and analyzed with PRISM 8.0 trial version. Descriptive statistics was used to calculate frequency and percentage for each of the responses given. Fisher exact test was used to find out association between receipt of formal training and knowledge regarding hand hygiene. p value of less than 0.05 was considered significant.

RESULTS

A total of 82 undergraduate medical students who participated and completely filled the questionnaire were included for analysis. Among the participants 53(65%) were female students and remaining 29(35%) were male students. All the participants were in the age group of 19-22 years. The study findings revealed that 48(58%) of students had received formal training in hand hygiene in the last three years and 46(56%) of students were routinely using alcohol-based hand rub for hand hygiene (Table 1).

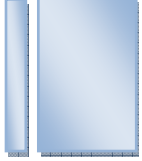

Table 1 Distribution of the Students as per age, gender, formal training and hand rub use (N=82)

Parameters	Frequency	Percentage
Age		
19 Years	2	2.45%
20 Years	36	43.9%
21 years	31	37.8%
22 years	13	15.85%
Gender		
Female	53	64.63%
Male	29	35.37%
Did you receive formal training in hand hygiene in the last three years?		
Yes	48	58.53%
No	34	41.47%
Do you routinely use an alcohol-based handrub for hand hygiene?		
Yes	46	56.1%
No	36	43.9%

While assessing knowledge among the students 77% of trained medical students answered correctly for the main route of cross transmission of harmful germs between patients in health care facility and 60% of trained medical students knew about the most frequent source of germs responsible for health care associated infections. Regarding hand hygiene actions preventing transmission of germs to the patient, all students of both the groups answered correctly for hand hygiene practice before touching a patient; however 87% of trained students mentioned correctly about hand hygiene immediately before a clean/aseptic procedure as against 64% of untrained students and this difference was statistically significant (p=0.02). (Table 2)

Regarding hand hygiene actions preventing transmission of germs to health care worker better awareness was seen among trained students than untrained students and the difference was statistically significant with respect to practices like after touching a patient (p=0.001) and after exposure to the immediate surroundings of a patient (p <0.0001). About knowledge on alcohol-based hand rub and hand washing with soap and water majority of students from both the groups correctly responded that hand rubbing is more rapid method for hand cleansing. Among the participants 81% of trained medical students correctly disagreed about hand rubbing causing skin dryness more than hand washing as against 52% of untrained students and this difference was statistically significant (p=0.007). More than 50% of students of both the groups were correct about hand washing and hand rubbing not being done in sequence. Among trained medical students 89% had answered correctly about the minimal time needed for alcohol-based hand rub to kill germs on hand as against 67% of untrained students and this difference was statistically significant (p=0.02). (Table 2)

More than 90% of the medical students irrespective of receipt of formal training on hand hygiene were aware about type of hand hygiene method required in the various situations like before palpation of abdomen, before giving an injection, after emptying a bedpan, after removing examination gloves and all the students were aware about the action after visible exposure to blood. However, statistically significant difference (p=0.005) was observed between two groups regarding awareness about type of hand hygiene method required after making a patients bed; where 75% of trained students mentioned it correctly as against 44% of untrained students. Regarding things to be avoided, as associated with increased likelihood of colonization of hands with harmful germs majority of students of both the groups mentioned it correctly. (Table 2)

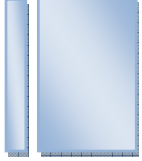

Table 2 Knowledge about hand hygiene based on "WHO hand hygiene knowledge questionnaire for health care workers" (N=82)

Questions (Answers)	Trained participants (N=48)	Untrained Participants (N=34)	P Value
The main route of cross-transmission of potentially harmful germs between patients in a health-care facility (Health-care workers' hands when not clean)	37(77.08)	20(58.82)	0.09
The most frequent source of germs responsible for health care associated infections (Germs already present on or within the patient)	29(60.42)	26(76.47)	0.15
Which of the following hand hygiene actions prevents transmission of germs to the patient?			
Before touching a patient (YES)	48(100)	34(100)	Not possible to calculate
Immediately after a risk of body fluid exposure (YES)	21(43.75)	20(58.82)	0.26
After exposure to the immediate surroundings of a patient (NO)	41(85.42)	26(76.47)	0.38
Immediately before a clean/aseptic procedure (YES)	42(87.5)	22(64.71)	0.02
Which of the following hand hygiene actions prevents transmission of germs to the health-care worker?			
After touching a patient (YES)	48(100)	27(79.41)	0.001
Immediately after a risk of body fluid exposure (YES)	47(97.92)	30(88.24)	0.15
Immediately before a clean/aseptic procedure (NO)	43(89.58)	27(79.41)	0.22
After exposure to the immediate surroundings of a patient (YES)	47(97.92)	22(64.71)	<0.0001
Which of the following statements on alcohol-based handrub and handwashing with soap and water are true			
Handrubbing is more rapid for hand cleansing than handwashing (TRUE)	46(95.83)	29(85.29)	0.12
Handrubbing causes skin dryness more than handwashing (FALSE)	39(81.25)	18(52.94)	0.007
Handrubbing is more effective against germs than handwashing (FALSE)	23(47.92)	17(50)	1
Handwashing and handrubbing are recommended to be performed in sequence (FALSE)	31(64.58)	20(58.82)	0.64
What is the minimal time needed for alcohol-based handrub to kill most germs on your hands? (20 seconds)	43(89.58)	23(67.65)	0.02
Which type of hand hygiene method is required in the following situations?			
Before palpation of the abdomen (rubbing)	45(93.75)	33(97.06)	0.63
Before giving an injection (rubbing)	45(93.75)	31(91.18)	0.68
After emptying a bedpan (washing)	45(93.75)	33(97.06)	0.63
After removing examination gloves (rubbing/washing)	46(95.83)	31(91.18)	0.68
After making a patient's bed (rubbing)	36(75)	15(44.12)	0.005
After visible exposure to blood (washing)	48(100)	34(100)	Not possible to calculate
Which of the following should be avoided, as associated with increased likelihood of colonization of hands with harmful germs			
Wearing jewellery (YES)	47(97.92)	33(97.06)	1

Damaged skin (YES)	48(100)	34(100)	Not possible to calculate
Artificial fingernails (YES)	46(95.83)	32(94.12)	1
Regular use of a hand cream (NO)	34(70.83)	17(50)	0.06

Figures in parenthesis indicate percentage

DISCUSSION

With the ongoing pandemic of COVID 19, the importance of hand hygiene is again recognized as an important public health measure and in our study, the knowledge of the same was assessed in undergraduate medical students with the "WHO hand hygiene knowledge questionnaire for health care workers" as WHO five moments concepts has been a recommended method used to improve understanding, training, monitoring, and reporting hand hygiene among healthcare workers.[11]

In our study, 58% of medical students had received formal training on hand hygiene which was more as compared to study done in Mysore medical college by Manasa et al in which 26% of medical and 33% of nursing students had formal training but less as compared to study done in Raichur by Nair et al in which 74% medical and 95% nursing students had formal training.[13,10] In our study, 56% of medical students regularly used alcohol based hand rub which was comparable to study done in by Manasa et al where 77% of medical students and 47% nursing students regularly used alcohol based hand rub and was very similar to a study done in ESIC college Gulbarga by Kamble et al where 58% students regularly used alcohol based hand rub.[13,14]

In our study, 77% of trained students and 58% untrained students were aware about the main route of cross transmission of harmful germs in hospitals which was more as compared to study done by Manasa et al in which less than 50% of medical and nursing students knew it and was similar to study done in Sri Lanka by Ariyaratne et al in which 73% of students had answered it correctly.[13,15] In our study, 60% of trained students and 76% of untrained students knew about most frequent source of germs responsible for health care associated infections which was more as compared to study done by Manasa et al where less than 40% knew it but was less as compared to study done in Puducherry by Arthi et al where 94% of students were aware of it.[13,5]

In our study, 89% of trained students and 67% of untrained students had knowledge about the minimal time needed for alcohol based hand rub to kill most germs on hands which was very high compared to 35% medical students in study done by Manasa et al and 15% in a study done by Arthi et al.[13,5]

Findings of study done by Manasa et al in Mysore medical college, where medical students had good knowledge about hand rubbing, hand washing and its uses in different situations and nursing students had more knowledge compared to medical students were similar to our study findings as far as medical students were concerned; however, nursing students were not part of our study.[13] The advantage of our study was that, we compared the knowledge between students who received the formal training on hand hygiene and who did not receive the same and this comparative aspect was not part of the other studies.

Lack of knowledge among the medical students, prevent them from adopting good hand hygiene practices even if facilities are available. Medical students spend more time with the patients, so chances of them spreading infections are more. Making them aware of this simple cost-effective measure during their training period itself will make them to follow it in their future. This can be achieved by training and motivating them about this measure. In developing nations, it is necessary to focus more on preventive measures which consume fewer resources. Hand hygiene is one such measure if practiced appropriately can lead to good results.[13]

LIMITATIONS

Source of information or type of previous formal training was not ascertained. Knowledge was tested based on questionnaire response only and no practical skills were evaluated; hence, the knowledge practice gap in performance of proper hand hygiene

cannot be commented upon. Also, there is a possibility of recall bias as exact time of receipt of formal training was not ascertained.

CONCLUSION

Most of the students were aware of the necessary health aspects of hand hygiene and those who had received formal training earlier showed better knowledge in few aspects related to transmission of germs between the patient and health care workers. Incorporation of proper mandatory training program on hand hygiene is required in the undergraduate medical teaching to generate awareness and it can play a pivotal role in preventing the transmission of hospital acquired infections as well as contemporary situations of COVID 19 pandemic. Such training sessions can be conducted for medical students in the initial years of study with retraining on regular basis for reinforcements of WHO guidelines in the form of posters, workshops etc.

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