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ORIGINAL ARTICLE

Hand Hygiene Awareness, Attitude and Compliance among House Officers in Public-Sector Dental Institutes- A Questionnaire-Based Study

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ABSTRACT

Objective: The objectives of this study were to evaluate the compliance of hand hygiene among dental health care professionals, to access different variables associated with hand hygiene and to identify possible ways of improving hand hygiene compliance.

Methods: This descriptive cross-sectional study was done to access the hand hygiene compliance, knowledge and practice of dental house officers in public dental institutes using a questionnaire developed by the authors. Descriptive statistics and chi square test were performed and a P value <0.05 was taken as significant.

Results: 88 dental house officers working in different clinical departments participated in this study. 90% of the respondents believed that hand hygiene plays an important role in cross infection control. More than two-third were aware of all the steps recommended for hand washing, but more than half were not following them. 60% of the respondents wash their hands before and after touching each patient. However, 30% wash hands after each patient and 10% only wash hands before touching every patient. Fifty-five (55.8%) of the participants routinely use alcohol-based rub for hand hygiene. There was a significant difference regarding hand hygiene training among different departments. (p<0.001) Majority of house officers working in prosthodontics and surgery had not received hand hygiene training.

Conclusion: Hand hygiene compliance is found to be acceptable when compared with developing countries. However, there was lack in knowledge. Dental graduates should be made aware of CDC and ADA guidelines. Better facilities and instruction for dental students should be encouraged. Hand hygiene quality needs to be improved on an urgent basis.

Keywords: Hand Hygiene, Dental Health, Hand Washing, Bacteria

INTRODUCTION

Hands of health care workers are more frequently exposed to diseases and often gets contaminated with pathogenic microorganisms including anti-microbial resistant organisms (MRSA) which are very difficult to treat, subsequently, posing a threat to patient health and safety.[1,2,3] Hand hygiene is one of the most effective and easy measure to stop cross contamination of harmful pathogens.[4,5] Studies have shown that hand hygiene and cross infection control single handedly played a chief role in reduction of cross-transmission of infections.[6,7,8]

The chances of health care associated infections are higher in developing countries when compared with developed countries.[9] In India, overall hand hygiene compliance was found to be 23% with 43% in private and 12% in public sector health care facilities.[10,11] However, Pakistan, despite being a developing country with a doctor to patient ratio of 1: 1000 and limited health budget, still has relatively higher hand hygiene compliance which is around 69%.[12,13]

All dental related procedures provide significant opportunity for microorganism to be transferred from the hands of a dentist to patient.[14,15,16] Similarly, dental assistants can acquire pathogenic microorganism as they get exposed to different surfaces in clinics including blood, saliva, tissues and dental instruments.[17,18] Dental assistants have to visit many rooms and touch a lot of clean and un-clean surfaces inside and outside clinics, where they may act as a mode of transmission for infections.[19,14] Therefore, even a routine dental checkup or treatment can result in cross-transmission of infection if hand hygiene is not followed.[19]

The agents used for hand hygiene and protocols regarding hand accessories are also part of hand hygiene. The Health Care Infection Control Practices Advisory Committee of the Center for Disease Control and Prevention has released new guidelines promoting the use of alcohol-based hand rubs due to lack of adherence to use of water and soap for hand hygiene.[20,21] Alcohol based rubs are quick, efficient, cause less irritation and improve compliance.[22,21] However, potential risk factors like finger nails, gloving technique, use of electronic gadgets including mobile phones, ring wearing and other hand accessories play an important role in transmission of infection along with non-adherence to handwashing[15,22,23]

The aims of this study were to evaluate the compliance of hand hygiene among dental health care professionals, to access different variables associated with hand hygiene and to identify possible ways of improving hand hygiene compliance.

METHODOLOGY

This questionnaire-based descriptive cross-sectional study was conducted from 5th April 2019 to 10th June 2020 with the approval granted by Institutional Review Board (IRB) of the de 'Montmorency College of Dentistry and the respective administrations of the participating institutes. (IRB Letter No. 13/DCD Dated 16-11-2021).

The questionnaire was developed by the authors after conducting literature review aimed at identifying compliance, knowledge and practice of hand hygiene in Pakistan. The questionnaire consisted of two parts, the first part addresses the demographics and second part consists of items targeting knowledge and practice of dental house officers regarding hand hygiene and cross infection control. The questionnaire was face validated by a panel of three senior researchers, later, a pilot study was conducted on 20 dentists and required modifications were made in the questionnaire.

The consent was added in online questionnaire and was taken before to ensure willful participation. All data was kept confidential and used for research and educational purposes only. The forms were immediately collected and checked for completion. A total of 88 dental house officers volunteered for the survey using quota sampling.

Statistical analysis was carried out on the data obtained using IBM Statistical Package for Social Sciences (SPSS version 20, IBM corporation, USA, New York, 2011). Descriptive statistics were used to summarize the results. Chi Square test was used to compare four departments regarding hand hygiene training. P value <0.05 was taken as significant.

RESULTS

A total of 88 dental house officers working in different clinical departments participated in this study. 24% were from Orthodontics, 12.5% from Prosthodontics, 17% from Surgery and 41% respondents were from Operative department. The response rate was 95%. The frequency of males was 25% and females was 47.5%. Mean age of participants was 24.8, SD 2.4.

One half (53.4%) of the respondents received formal training for hand hygiene during last three years in their respective institutes. There was no significant difference among the four major department regarding hand hygiene training. Majority of the house officers working in operative (47%) and orthodontic department (64%) received hand hygiene training, whereas as surgery (60%) and prosthodontics (57%) department were least trained.

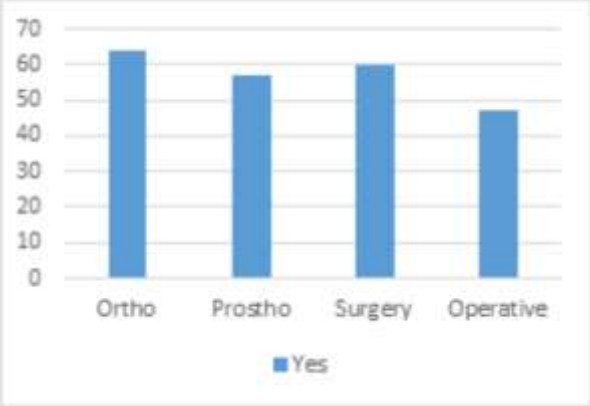

Figure 1: Hand hygiene training in different departments

Around 90% of the respondents believed that hand hygiene plays an important role in cross infection control and 92% reckoned that assistants should be formally trained regarding hand hygiene. One-third the respondents think wearing gloves eliminates the need of hand hygiene or washing of hands. Around 70% of the respondents were in favour of using warm water for handwashing while around one-half (54%) the respondents think soap and water are enough for hand hygiene. Only 32% of respondents favoured alcohol-based rub as necessary item for hand hygiene. However, 12% of the respondents thought water alone is sufficient for hand hygiene. More than two-third (70%) of the respondents responded that they were fully aware of all the steps recommended for hand washing. However, when asked about individual steps in proceeding questions, more than half of the respondents were not following all the steps required for hand washing. More than half (55.8%) of the participants routinely use alcohol-based rub for hand hygiene, however only number of respondents knew the correct time needed for alcohol-based rub to kill most of germs from hands. Moreover, around 40% the respondents think alcohol-based rub is effective option when the hands are soiled and visibly dirty, 40% thought it's not an effective option while 20% lacked knowledge. Half of the respondents think hands should be dried in air, while 19% think hands should be dried using cloth towel, 15% were in favour of paper towel, while 17% of participants favoured electric air dryer as preferable method. Majority (90%) of the respondents believe hand accessories (rings, finger nail extensions, watches) should be removed before hand washing. **(Table 1)**

Table 1: Knowledge and Attitude of Dental House Officers regarding Hand Hygiene

Statements	(%)
Hand hygiene plays an important role in cross infection control	
Yes	89.8
No	10.2
Assistants should be trained regarding hand hygiene	
Yes	92.0
No	6.8
Don't Know	1.1
Do you know all the recommended steps of hand washing	
Yes	70.5
No	29.5
Wearing gloves eliminates the need of hand hygiene	
Yes	29.5
No	63.6
Don't Know	6.8
Hand accessories be removed before hand washing	
Yes	87.5
No	9.1
Don't Know	1.1
Type of water should be used for washing hands	
Hot	18.2
Cold	11.4
Warm	70.5
Hands should be dried after washing them with water	
Yes	68.2
No	26.1
Don't Know	3.4
How hands should be dried after washing	
Air dry (dry naturally)	46.6
Using cloth towel	18.2
Using paper towel	14.8
Electric hand dryer	17.0
Alcohol-based rub an effective option when hands are visibly soiled and dirty	
Yes	38.6
No	38.6
Don't Know	20.5
Minimum time needed for alcohol-based rub to kill most of germs on hands?	
20 seconds	46.6
10 seconds	43.2
5 seconds	10.2

Table 2: Practices of Dental House Officers regarding Hand Hygiene

Statements	(%)
Do you practice hand hygiene?	
Before touching the patient	10.2
After touching the patient	28.4
Before and after touching the patient	59.1
What hand hygiene agent do you use in your health care setting?	
Water	12.5
Soap and Water	53.4
Alcohol based rub	31.8
Other	1.1
Do you scrub your hands thoroughly for 20- 30 second by the clock with proper procedure before touching the patient?	
Yes	44.3
No	53.4
Do you routinely use alcohol-based rub for hand hygiene?	
Yes	54.5
No	43.2

Figure 2: Self-reported satisfaction with hand hygiene practices

A total of 60% of the respondents wash their hands before and after touching each patient. However, 30% of respondents only wash hands after touching each patient and 10% of the participants only wash hands before touching every patient. Only

7% of the respondents revealed they always wash hands, while 28% of the respondents reported they never wash hands before wearing gloves. Rest of the respondents reported that they 'sometimes' wash their hands before wearing the gloves.

Roughly one-half (45.3%) of the respondents reported that they scrub hands thoroughly for 20-30s by the clock with proper procedure before touching the patient.

One-half (50%) of the respondents think they are comfortable with their hand hygiene practices, regardless of what the CDC guidelines recommend. **(Figure 2)**

DISCUSSION

Effective hand hygiene is the most important factor for prevention and spread of microorganism in any healthcare settings. In dental settings, hand hygiene holds a paramount importance and an efficient way to practice cross infection control. The risk of transmission of pathogens from a dental office is a frequent yet highly variable phenomenon. In developed countries, the frequency seems to be lower, but in developing and under-developed countries with limited resources, it cannot be considered negligible, therefore, hand hygiene holds even more importance as single most important step to control cross infection especially in developing countries. [24][25][26]

In this study, the knowledge, attitude and practices of public-sector house officers towards hand hygiene were noted. Moreover, the hand hygiene compliance among different dental departments and the satisfaction of house officers regarding their hand hygiene was also investigated.

Previous studies conducted all over the world have yielded widely disparate results when it comes to hand hygiene compliance. Furthermore, in health care settings, there was a significant difference between self-reported and actual observational hand hygiene compliance. Hand hygiene compliance ranged from 50 to 76 percent in developed countries such as the United States, Canada, and China [27][28][29][30][31]. However, while self-reported hand hygiene compliance in European countries was around 50%, observational studies reported compliance as low as 36%. [32][33][34] Compliance was found to be 50% in developing countries such as India [35]. Despite the limited resources of public-sector medical institutes, self-reported hand hygiene compliance was found to be around 60% in our study. Surprisingly, these findings were consistent with other studies conducted around the world in developing countries. [35] The improved hand hygiene compliance may be due to the better supervision in dental clinics, religious beliefs and culture that compels handwashing practices.

When asked about simpler knowledge-based questions like 'role of hand hygiene in cross-infection control', 'training of dental assistants' and 'removal of hand accessories', more than 90% of the participants replied in agreement and were well aware of the correct response. The results were in agreement with the studies conducted worldwide. Majority of healthcare workers were aware of the importance of hand hygiene and role dental assistants in limiting cross infection in dental clinics. [36][37][38]

Studies have shown that the majority of dental practitioners wash their hands when necessary but not as recommended. The American Dental Association (ADA) has recommended hand hygiene protocols for dental health care professionals ranging from routine hand washing to surgical sepsis. The ADA guidelines for hand hygiene are based on the (CDC) guidelines for dental settings, which were released in 2003. [39][40] Dental health care professionals all over the world should not only be aware of these guidelines, but should also put them into practice on a daily basis. [41] One-third of those surveyed were unaware of the recommended hand washing procedures. As a result, there is an urgent need to raise awareness about hand hygiene among house officers through workshops or tutorials.

Wearing gloves during dental procedures helps to prevent cross infection, but it is never a replacement for good hand hygiene. A dirty hand in a latex glove might be a possible source of infection, as latex gloves can be pulled off during dental procedures. High speed dental drills, needles and patients' bite during dental procedure may possibly result in exposure of underline skin and cross contamination, making it even more crucial for dentists to practice hand hygiene strictly. [42] Around sixty percent of respondents in this study were in agreement that wearing glove does not eliminate the need of hand hygiene whereas one third of the respondents answered otherwise, warranting a need for intervention to spread awareness regarding the hand disinfection before wearing gloves.

ADA and CDC have recommended the use of soap and water for washing hands and paper towel as a preferred drying agent. According to research, paper towels dry hands quickly, effectively eliminate bacteria, and create less contamination of the lavatory environment. Paper towels outperform electric air dryers. Paper towels should be advised in places where hygiene is of the utmost importance, such as hospitals and clinics. Moreover, if the faucet does not have automatic shut off system, a long handle which u can move with elbow or a foot pedal, it has been recommended to use that paper towel as a barrier to shut off that tap. The temperature at which you would need to heat the water to kill microorganisms would burn the skin. Studies have shown no conclusive evidence that washing hands in warm water is better for removing germs. Therefore, wash at normal temperature. [43][39][41] Around half of our respondents were practicing hand hygiene using soap and water, whereas, only 14.8% answered correctly about the paper towel. Majority of the respondents in this study believed that hands should be air dried after washing with warm water.

According to a survey from the United States Department of Agriculture (USDA), up to 9 out of 10 people wash hands incorrectly. WHO suggests cleansing hands for 20-30 seconds in routine and up to 60 seconds if the hands are visibly soiled. Scrubbing for 20-30 seconds can efficiently remove contaminated microorganisms. [44] Around 44% of the respondents in this study follow 20-30 seconds of scrubbing during hand washing. [41] Furthermore, 38% believed that alcohol-based rub is a good alternative for hand cleanliness even when hands are obviously filthy, while 20% were uninformed. When asked about the routine use of alcohol rub and minimum time required to use alcohol-based rub to kill germs effectively from hands, more than half of the respondents answered incorrectly (53.4%) even though they were using alcohol rub routinely (54.5%). This surprised the authors; therefore, we recommend workshops or small group demonstrations to spread awareness about hand hygiene practices among young dental graduates and house officers.

There was no significant difference among the four major department regarding hand hygiene training. Majority of the house officers working in surgery and orthodontic department received hand hygiene training, whereas as operative and prosthodontics department were least trained. This was against the expectations of the authors as operative department is critical when it comes to infection control cross contamination. The Centres for Disease Control and Prevention strongly advises practising hand cleanliness before and after touching patients. [39][40] In the current study, 59 percent of responders exercise hand hygiene according to CDC guidelines, while 28 percent only practise hand hygiene after treating the patient. Hand cleanliness before and after touching the patient is critical for cross infection prevention. Because 28 percent is a big percentage, it is necessary to raise awareness in order to modify this behaviour.

CONCLUSION:

In this study, hand hygiene compliance was found to be acceptable when compared to regional developing countries, but not when compared to the developed countries. The data suggested that hand hygiene compliance, as well as awareness of cross infection prevention and disinfection, should be improved on urgent basis. Furthermore, better facilities and instruction, such as lectures, workshops, pamphlets, diagrams, display of guidelines, and workshops focusing on cross infection control and hand cleanliness, should be encouraged. To promote hand hygiene

compliance, dental graduates should be made aware of CDC and ADA guidelines.

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