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RESEARCH ARTICLE

KNOWLEDGE AND PRACTICES ABOUT DENTAL IMPRESSION DISINFECTION IN A TEACHING DENTAL COLLEGE OF KARACHI, PAKISTAN

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ABSTRACT

Background: Blood or saliva is considered as a direct carrier of infection, whereas contaminated equipment's, surfaces and airway carry infection indirectly, and the transmission is mainly due to lack of hygiene standards, disinfection and sterilization procedures. This study was conducted to assess the knowledge and practices of dental impression disinfection among the graduates and undergraduates of Baqai dental college, Karachi. **Methods:** A cross sectional study was conducted among the graduates and undergraduates of Baqai dental college, Karachi. The two-page anonymous questionnaire contained questions on personal information such as age, sex and level of education followed by multiple-choice questions to evaluate the knowledge and practice regarding disinfection of dental impressions sent to the laboratory. Data was recorded and analyzed in SPSS 20. **Results:** A greater number of the study participants practice disinfecting the impressions through liquid disinfectant spray (34.8%, n = 55) and sodium hypochlorite (34.2%, n=54) while rest of them disinfect impression through washing with soap and tap water (31%, n = 49). Half of the participants picked sodium hypochlorite as the most commonly used (47.5%, n = 75) chemical for disinfection of laboratory work surfaces. **Conclusion:** Lack of information about cross contamination protocol and its implementation results in the transfer of the blood-borne and saliva borne diseases to the technicians from patients which could have been easily be avoided by following the proper disinfectant protocol.

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INTRODUCTION

Cross contamination is one of the major risk factors for the dental professionals (Moradi Khanghahi, 2013). Blood or saliva is considered as a direct carrier of infection, whereas contaminated equipment's, surfaces and airway carry infection indirectly. AIDS, Hepatitis, Herpes and Tuberculosis are very frequently passed to the health care workers (HCW) through patients and this issue is of grave concern in dentistry (Amin, 2014; Zaker Jafari, 2014). This transmission is mainly due to lack of hygiene standards, disinfection and sterilization procedures (Al-Omari, 2005). The responsibility of ensuring impressions have been cleaned and disinfected before dispatch to the dental laboratory lies solely with the dentist (Almortadi, 2010).

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The tools and devices used in dentistry are classified into three categories on the basis of application and the potential risk of transmission: critical, semi critical and non-critical. Impressions and their materials fall in the second category because of their contact with mucous membrane or unhealthy skin. Due to the fear of distortion of dental impressions, they are sent without disinfection to the laboratory (Zaker Jafari, 2014). Therefore the laboratory personnel get infected by the pathogenic microorganisms from impressions and contaminated items (Sedky, 2014). During the fabrication of prosthesis, special care should be given for every step, especially impressions as they are a main source of infection for any potentially infectious material (Jain, 2018). Dental impressions contaminated with patients' blood and saliva cause contamination of the stone cast models.It was reported that over 60% of the prostheses transferred to clinics from laboratories are contaminated with pathogenic microorganisms emerging in the oral cavity of other patients (Sedky, 2014).

A survey done on 400 Dental laboratories in USA found that besides lack of knowledge about disinfecting procedures for impressions, dentists and labs disinfect impressions for longer than recommended durations because of the lack of awareness (Amin, 2014). Prevention of contaminated dental impressions and other dental items leaving the immediate chair side area is an ideal way to control cross-contamination. In a study conducted in dental colleges of India, it was concluded that there is lack of commitment to high standards of infection control (Marya *et al*., 2011). On the other hand, a study conducted in Lahore among the students and house officers revealed that they do have knowledge and are following cross infection protocols for impression disinfection (Amin, 2014). In Karachi dentists in different hospitals were having poor knowledge about the use of disinfecting agents. The dental impressions are one of the major causes of cross contamination and it has been observed in the previous studies that majority of dental practitioners were not aware of impression disinfection and it was not practiced in the clinics and hospitals. This study was conducted to assess the awareness and practices of disinfection of dental impressions among the graduates (Faculty, house officers) and undergraduates (final year students) of Baqai dental college, Karachi.

MATERIALS AND METHODS

A cross-sectional study was conducted in Baqai dental college, Karachi. The study was conducted during 6 months period from July – December in 2018 among the graduates (Faculty and house officers) and undergraduates (fourth year BDS students).Forty one faculty members who are involved in clinical practices, fifty six house officers of the year 2018 and sixty one final year students of BDS who were present on the day of data collection were included in the study. A validated self-administered questionnaire was used as data collection tool (Amin, 2014). The two-page anonymous questionnaire contained questions on personal information such as age, sex and level of education. This was followed by multiple-choice questions to evaluate the knowledge and practice regarding disinfection of oral and dental impressions sent to the laboratory. The following subjects incorporated in the questionnaire; such as procedure for dispatch of impressions to the laboratory, procedure for disinfection of impressions, impression disinfection techniques, familiarity with appropriate disinfection methods and materials for different trays and impression materials, and the preferred mode for advancement of knowledge on infection control.

An informed written consent was obtained from all the participants. The ethical review board of Baqai dental college granted the ethical approval for the study. Data was entered and analyzed through SPSS version 22 (Morgan, 2012). Descriptive statistics were recorded in terms of percentages and frequencies for categorical data.

RESULTS

A total of 158 participants were included in the study. Male were 77(48.7%) and female 81(51.3%). Majority of the participants were final year students 61 (38.6%) followed by house officers 56 (35.4%) and then faculty members 41(25.9%). Majority (41.1%) of the total study participants reported of using antimicrobial soap for hand washing as their daily practice.

A greater number of the study participants practice disinfecting the impressions through liquid disinfectant spray (34.8%, n = 55) and sodium hypochlorite (34.2%, n=54) while rest of them disinfect impression through washing with soap and tap water (31%, n = 49). Half of the participants picked sodium hypochlorite as the most commonly used (47.5%, n = 75) chemical for disinfection of laboratory work surfaces followed by phenol (31%, n=49) while laboratory and hand instruments were mostly disinfected by the sodium hypochlorite (43%, n=68) followed by gluteraldehyde (24.1%, n=38).

DISCUSSION

It is an essential part of practice for all professionals associated with the healthcare profession and systems to do cross infection control and ensures the health and safety of the patient and doctor both (Shah, 2009). The common dental practice encounters dealing with blood and saliva on a regular basis. Hence, the dental practitioner should be aware of infection control protocols. Dental impressions like other procedures of dentistry is a source of infection for any potentially infectious disease (Connor, 1991; Johnson, 1998; Kess, 2000). As American Dental Association (ADA) guidelines state that impressions should be rinsed to remove saliva, blood and debris and then disinfected before being sent to the laboratory (Bhat, 2007). It is the responsibility of a dentist to ensure that all impressions and appliances are cleaned and disinfected before being sent to the laboratory or before being used for a patient (Bhat, 2007). It is not only important from the patient's safety point of view but also for the personal health and safety of the dental assistants, auxiliary staff and technicians. Unfortunately, the level of infection control in the Pakistan, like India, is lagging behind that of the developed countries of Europe and United States (Marya, 2011). Barrier system must be followed in the laboratory on regular bases which includes hand washing with plain or antimicrobial soap.[14] Majority of the participants in the present study and in the previous literature showed that they were washing their hands before and after taking impression.[2] The present study reports that majority of the participants clean their hands by using water with anti-microbial soap which is similar to the results reported in a study conducted in Lagos Nigeria which was also a hospital based study and 48.7 % participants in the study reported using water with anti-microbial for hand washing. Fifty percent of the participants were washing the impression tray before taking impression in the present study whereas in another study 100% of the participants were practicing of washing impression trays before taking impression (Ukuoghene, 2017), The present study and the past literature states that there is lack of awareness of the proper protocol to be followed while using the impression trays .The sterilized trays should be directly used in patient's mouth without rinsing them with water.

Disinfection of the impressions reported in the present study is in line with the other study conducted in Saudia Arabia showing that mostly it is done by the liquid disinfectant immersion (Sedky, 2014). Immersion disinfection has been preferred to spraying because immersion is more likely to assure exposure of all surfaces of the impression to the disinfectant for the recommended time (Bhat, 2007). Where as in other studies conducted in India the results are in contrast to our study stating that majority of the dental practitioners disinfect the impressions by washing them under water (Jain, 2018; Marya, 2011).

Table 1. Practices of dental impression disinfection

S.No	Questions	Yes n (%)	No n (%)
1.	Do you disinfect alginate impression?	114(72.15 %)	44(27.84 %)
2.	Do you disinfect rubber base impression?	115(72.78 %)	43(27.21%)
3.	Do you disinfect impression compound?	114(72.15%)	44(27.84%)
4.	Do you disinfect zinc oxide eugenol?	106(67.08%)	52(32.91%)

Table 2. Display the participants' responses regarding the knowledge about appropriate methods and type of disinfectants used for different impression materials and methods of disinfection of different laboratory and hand instruments.

S No	QUESTIONS	Frequency (%)
1	Washing your hand before impressionmaking is important?	
	Not sure	24 (15.18%)
	Never	14 (8.86%)
	Sometimes	41 (25.94%)
	Always	79 (50%)
2	Do you wash tray before impression making?	
	Not sure	17 (10.75%)
	Never	30 (18.98%)
	Sometimes	46 (29.11%)
	Always	65 (41.13%)
3	Which disinfectant is mostcommonly used in your department?	
	Gluteraldehye	40 (25.31%)
	Phenol	25 (15.82%)
	Idophore	9 (5.69%)
	Hypochlorite	50 (31.64%)
	Any other	13 (8.22%)
	Don't know	21 (13.29%)
4	What protocol is followed in your disinfection department for storage of impression after?	76 (48.10%)
	Plastic bag	29 (18.35%)
	Tissue paper	25 (15.82%)
	Sealed plastic bag	27 (17.08%)
	Disinfectant soaked paper towel	1 (0.63%)
	Don't know	
5	Approximately what is the typical duration of disinfecting impressions by the prosthodontist before you receive them?	57 (36.1%)
	One minute	59 (37.3%)
	Ten minute	32 (20.3%)
	Thirty minutes	3 (1.9%)
	Sixty minutes	7 (4.4%)
	Don't know	
6	What method do you use for alginate impressions disinfection?	
	Spray with disinfectant	29 (24.7%)
	Immerse in disinfectant	33 (14.6%)
	Spray and immerse in disinfectant	60 (38.0%)
	Rinse under running water and immerse in disinfectant	36 (22.8%)
7	What method do you use for rubber base impressions disinfection?	
	Spray with disinfectant	
	Immerse in disinfectant	48 (30.4%)
	Spray and immerse in disinfectant	30 (19.1%)
	Rinse under running water and immerse in disinfectant	57 (36.1%)
		23 (14.1%)
8	If you immerse rubber base impressions in a disinfectant, what is the duraion of immersion?	
	One minute	57 (36.1%)
	Ten minute	63 (39.9%)
	Thirty minutes	24 (15.2%)
	Sixty minutes	2 (1.3%)
	Don't know	12 (7.6%)
9	How do you deal with laboratory work surfaces after work is completed?	
	Cleaned	53 (35.5%)
	Disinfected	20 (37.7%)
	Cleaned and disinfected	85 (53.8%)
10	How do you deal with laboratory hand instruments such as spatulas,mixing,bowls,knives,wax carvers,etc.between their use?	56 (35.4%)
	Cleaned only with water	102 (64.4%)
	Cleaned and disinfected	
11	For how long do you disinfect with laboratory hand instrument?	
	One minute	61 (38.6%)
	Ten minute	60 (38.0%)
	Thirty minutes	26 (16.5%)
	Sixty minutes	4 (2.5%)
	Don't know	7 (4.4%)
12	How do you disinfect impression compound?	39 (24.7%)
	Spraying	21 (13.3%)
	Immersion	38 (24.1%)
	Cotton soaked in disinfectant	16 (10.1%)
	Dip in disinfectant	44 (27.8%)
	Don't know	
13	How do you disinfect zinc oxide eugenol?	
	Spraying	28 (17.1%)
	Immersion	21 (13.3%)
	Cotton soaked in disinfectant	37 (23.4%)
	Dip in disinfectant	18 (11.4%)
	Don't know	54 (34.2%)

The study conducted in Saudi Arabia stated ten minutes time duration for the disinfection of the impressions which is in accordance with the results of present study and its useless to disinfect impressions without following the recommended time. ADA recommends Chlorine compounds such as sodium hypochlorite solutions, iodophors and aldehydes such as formaldehydes and glutaraldehydes for disinfection.[14]Chemical agents are used mainly to disinfect the laboratory surfaces and the hand instruments used in the laboratory .Most of the respondents in the present study agreed with the use of chemical agents for the disinfection and mostly stated sodium hypochlorite as the most commonly used agent followed by phenol as the second choice for the laboratory surfaces disinfection and for the laboratory and hand instruments they are using gluteralehyde as the first choice followed by sodium hypochlorite. The results of present study are in line with other studies apprising chemical agents as commonly used method for disinfection and sodium hypochlorite, glutaraldehyde, chlorhexidine and iodine agents as most commonly used chemical agents (Sedky, 214; Jain, 2018; Walsh, 2012) whereas in previous literature we can also find contrast results to the present study stating the most commonly used method for disinfection is washing under running water and only thirteen percent reported that impressions were treated by chemical disinfectants. The results of this study showed that there is a lack of uniformity and commitment to maintain standards of infection control practices among dental undergraduate and graduates. The importance of cross-infection control is not understood clearly. The perception of its importance is taking longer than it should to treat the matter seriously (Marya *et al*., 2011).

Conclusion

From the present study this can be concluded that there is a lack of uniformity and commitment to maintain standards of infection control practices among dental undergraduate and graduates. The importance of cross-infection control is not understood clearly. The perception of its importance is taking longer than it should to treat the matter seriously. Lack of information about cross contamination protocol and its implementation results in the transfer of the blood-borne and saliva borne diseases to the technicians from patients which could have been easily be avoided by following the proper disinfectant protocol.

Recommendations

It is suggested that the disinfection and cross infection control protocols should be taught and enforced at the undergraduate levels. This should include the training in protocol as well as personal protection against accidental infection. The dental graduate should be trained in maintaining safe clinical environment, decontamination of instruments, appliances and impressions, and proper transfer of impression to the labs and disposal of waste. The dental technicians and other dental auxiliary staff should be taught, trained and regularly examined through proper training and reinforcement of the protocols. It is also recommended that the healthcare institutes and organizations should make it mandatory to receive training upon commencing employment, of both dentists and dental staff, with regular updates on medical history. Immunization status and post-vaccination blood test results should be obtained and retained at start of employment of the staff and doctors. Policies such as the management of inoculation injuries, pictorial images, for example hand washing technique should be clearly displayed in the department to encourage compliance and to promote good practice.

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