ORIGINAL ARTICLE

Awareness And Practice of Cross Infection Control in Prosthodontics Department among the Undergraduates, Graduates and Postgraduates in a Tertiary Dental Health Care Institution

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ABSTRACT

Objective: To evaluate the awareness and practice of cross infection control among the undergraduates, graduates and postgraduates in Prosthodontics Department of a tertiary dental health care institution.

Study Design: Cross-sectional survey.

Place and Duration of Study: The study was carried out in March 2022 to May 2022, at Prosthodontics Department of Armed forces institute of Dentistry (AFID), a tertiary dental health care institution, Rawalpindi.

Materials and Methods: Self-administered questionnaires were distributed. Data was analysed using IBM SPSS Statistics 24 software and descriptive statistics including frequencies were calculated.

Results: The response rate was 100%. 99.2% participants had knowledge of sterilization, disinfection and asepsis. 98.5% believed that cross infection control is important in prosthodontics; 80% believed that sterilization protocol is being followed in the tertiary dental health care institute. 88.5% used gloves and 86.5% disinfected dentures before final insertion. 66% did not use eyewear, 75.4% did not disinfect rubber bowl in between patients. 56.9% did not disinfect facebow before sending it to dental laboratory.

Conclusion: The overall knowledge, attitude and performance of participants included in this study were found to be satisfactory. Workshops and awareness programs should be conducted on regular basis for the students from the beginning of preclinical years of under graduation of dentistry.

Keywords: *Awareness, Cross Infection Control, Practice, Prosthodontics Department.*

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Introduction

Cross infection is the transfer of damaging microorganisms among people, equipment or within the body usually in a clinic/ hospital setup.[1] Dental health practitioners are exposed to various microorganisms due to direct contact with patient, exposure to blood, saliva, secretions and indirect contact with contaminated instruments, operatory equipment or objects. High risk infections such as HBV, HCV, AIDS, TB, syphilis etc. can be contracted from unsterile dental environments.[2] Prosthodontics patients are generally considered a high risk group due to their potential to transmit infectious diseases as well as to acquire them[3] as more than 60% of prosthesis delivered to clinics from laboratories are contaminated with pathogenic microbes originating in the oral cavity of patients.[4]

Infection control is defined as "Measures taken by the health care personnel to reduce the risks of transmission of infectious agents to patients and employees". Implementation of standard precautions in dental institutes is most effective way to control cross-infection as dental students are involved in direct patient treatment as part of clinical training.[5]

Wearing gloves, masks, protective eye wear, white coats, use of sterile instruments, washing hands before and after changing the gloves, vaccination,

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proper post exposure management and properly disinfecting dental impressions, casts, instruments, trays and effective communication between dental lab and clinic will ensure infection controlling prosthodontics departments.[2]

In tertiary dental health care institutions, infection control lectures commence during the 2nd year. In the 3rd and 4th years of study, students apply these concepts in clinical training sessions. The cognitive, psychomotor and affective domain of dental students about infection control directly relates to patient care.[5] Previous studies conducted on infection control in general dentistry practice did not cover few important aspects in infection control in prosthodontics.[2,3,4] The aim of the study is to evaluate the awareness and practice of cross infection control among the undergraduate, graduates and postgraduates in prosthodontics department of a tertiary dental health care institution.

Materials and Methods

A quantitative descriptive, cross-sectional self-administered questionnaire was administered in March 2022 to May 2022 in Prosthodontics Department of a tertiary dental health care institution.

The questionnaire designed by reviewing literature; and discussed with consultants and supervisors of the same speciality after which amendments were made. Pilot study was conducted on 30 participants. A sample size of 132 was calculated using WHO sample size calculator, with 95% confidence level. The inclusion criterion was participants of Armed Forces Institute of Dentistry who consented to participate. Exclusion criteria included participants from other institutes and specialities other than prosthodontics. Data was collected via Google forms as well as a hardcopy of questionnaire was circulated after taking consent from the participant and explaining the purpose of the study. The aim of the study was to assess the awareness of cross infection control. The self-administered questionnaire with some pretested questions included in similar studies was reviewed and the study was ethically approved by the Ethical Committee/Institutional Review Board; Reference Number: 905/Trg-ABP1K2 dated 17 Aug 2021. There was no missing data when the questionnaire was collected. All information was kept confidential by using password in Google Forms and keeping hard copies under lock and key.

The questionnaire was divided into 2 sections (A) Demographic data: Name, gender and education level (B) Seventeen close-ended questions assessed the knowledge, attitude and practice of cross infection control in the prosthodontics department, along with questions regarding Hepatitis B vaccination and needle stick injury protocol awareness. Data was analysed using IBM SPSS Statistics 24 software. Descriptive statistics including frequencies were calculated.

Results

Percentages of participants taken in the sample size are represented in Figure 1 and Figure 2. Among the dentists only 76.2% were vaccinated against Hepatitis B 83% were well-informed regarding needle stick injury management, while 16.9% were not confident.

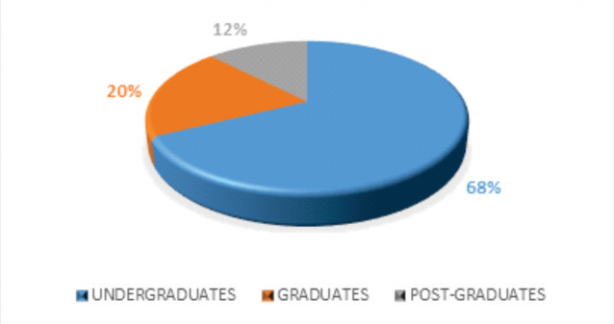

Fig 1: No of Participants

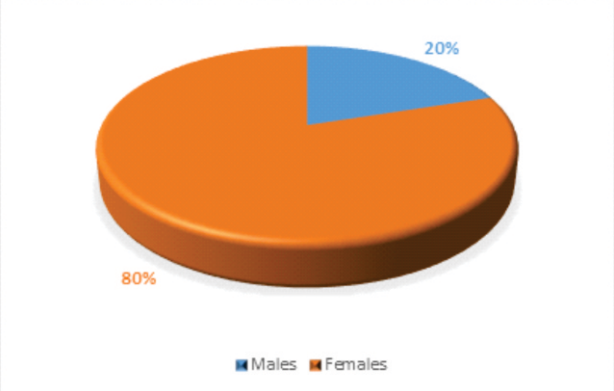

Fig 2: Gender of Participants

All the groups showed a good level of awareness and attitude regarding cross infection control (Table 1). 99.2% knew the terms sterilization, disinfection and asepsis. 98.5% believed that cross infection control is important in prosthodontics and 80% believed that sterilization protocol is being followed in the tertiary dental health care institution. 88.5% used gloves

and 86.5% disinfected denture before final insertion. But a percentage of participants showed negligence as 66% did not use eyewear, 75.4% did not disinfect rubber bowl in between patients and 56.9% did not disinfect facebow before sending it to dental laboratory. (Table 1).

Table 1: Responses of participants as well as combined. *P* value is 0.000 and is significant

	Questions	Under-Graduates		Graduates		Post-Graduates		Total Yes %	Total No %
		Yes%	No%	Yes%	No%	Yes%	No%		
1	Are you aware of following terms: sterilization, asepsis & disinfection?	98.8	1.1	100	0	100	0	99.2	0.8
2	Do you know about different sterilization methods?	98.8	1.1	96.2	3.8	100	0	98.5	1.5
3	Can infectious diseases be transmitted without asepsis?	94.3	5.7	96.2	3.8	75	25	92.3	7.7
4	Do you think sterilization protocol is being followed in the tertiary dental health care institute?	81.8	18.2	76.9	23.1	75	25	80	20
5	Is infection control important in prosthodontic procedure?	97.7	2.3	100	0	100	0	98.5	1.5
6	Do you use hand sanitizer before after handling patient?	81.8	18.2	76.9	23.1	75	25	80	20
7	Are you using following protective barriers during prosthodontic procedures?								
	Gloves	84.1	15.9	96.2	3.8	100	0	88.5	11.5
	Facemask	75	25	84.6	15.4	93.8	6.2	79.2	20.8
	Eyewear	34.1	65.9	26.9	73.1	43.8	56.2	33.8	66.2
	Headcaps	34.1	65.9	11.5	88.5	12.5	87.5	26.9	73.1
	Gowns	33	67	19.2	80.8	18.8	81.2	28.5	71.5
8	Do you disinfect following items in between patients?								
	Rubber bowl	22.7	77.3	15.4	84.6	50	50	24.6	75.4
	Mixing spatula	23.9	76.1	23.1	76.9	50	50	34.6	73.1
	Face bow	27.3	72.7	30.1	69.2	68.8	31.2	33.1	66.9
	Cutting/finishing burs	40.9	59.1	69.2	30.8	75	25	50.8	49.2

9	Do you disinfect these items before sending it to dental lab?								
	Dental cast	55.7	44.3	57.7	42.3	100	0	61.5	38.5
	Wax rims	56.8	43.2	61.5	38.5	93.8	6.2	62.3	37.7
	Denture prosthesis	59.1	40.9	69.2	30.8	100	0	66.2	33.8
	Metal framework	44.3	55.7	38.5	61.5	87.5	12.5	48.5	51.5
	Face bow	39.8	60.2	26.9	73.1	87.5	12.5	43.1	56.9
10	Do you remove accessories (rings, bangles, watches) before starting treatment?	61.4	38.6	50	50	50	50	57.7	42.3
11	Impressions should be? (choose correct option)								
	Disinfected only	18.2	81.8	0	100	6.2	93.8	13.1	86.9
	Washed only with water	6.8	93.2	0	100	12.5	87.5	6.2	93.8
	Washed then disinfected	84.1	15.9	96.2	3.8	100	0	88.5	11.5
12	Are there chances of contamination of denture during finishing/polishing?	86.4	13.6	88.5	11.5	100	0	88.5	11.5
13	Do you disinfect the final denture before insertion?	83	17	88.5	11.5	100	0	86.5	13.8
14	Do you wear gloves during cast pouring?	54.5	45	50	50	87.5	12.5	57.7	42.3
15	Is the sterilization pouch keenly checked before opening?	68.2	31.8	65.4	34.6	62.5	37.5	66.9	33.1
16	Does your assistant change tapes between patients?	83	17	57.7	42.3	43.8	56.2	73.1	26.9
17	Do you disinfect your own instruments (wax knife, carvers, pliers) while working on dentures of different patients?	42	58	57.7	42.3	50	50	46.2	53.8

Discussion

Asepsis is freedom from infection or infectious (pathogenic) material.[6] Sterilization is a process of complete elimination or destruction of all forms of microbial life (i.e., both vegetative and spore forms),[7] which is carried out by various physical and chemical methods.[8] Disinfection is a process of complete elimination of vegetative forms of microorganisms except the bacterial spores from inanimate objects.[9] In the current study, 99.2% participants reported to have knowledge of asepsis, sterilization and disinfection.

According to WHO, two million needle injuries cause approximately 66,000 HBV, 16,000 HCV and about

1000 HIV infections among 35 million health care workers each year.[10] Dentists are well aware of transmission, preventive measures and protection after exposure to these infections.[10] Verification of sterilization and disinfection processes is essential for protection of health and welfare of the general population.[8] This study indicated that most undergraduates, graduates and postgraduates of tertiary dental health care institute were well-aware that infectious diseases can be transmitted if sterilization and disinfection protocols are not followed. 98.5% stated that infection control is very important in prosthodontics procedure and 80% believed sterilization protocol is being followed in the tertiary dental health care institution.[9,10]

Primary protective barriers, used in specified circumstances to reduce the risk of exposures to saliva/blood borne pathogens, are mandated by Occupational Safety and Health Administration (OSHA).[11] Bhat et al. assessed that barrier system must be followed routinely in the prosthodontic laboratories.[9] Majority of the participants in our study complied to wear gloves (88%) and facemasks (79.2%). However, a lesser concern was observed regarding the use of other protective barriers such as protective eyeglasses (33.4%), headcaps (26.9%) and gowns (28.5%).These results supported the previous studies where similar disregard was noted.[12, 13, 14] The use of protective eyewear by dental students and interns was found to be low in particular which is consistent with other studies.[15, 16, 17] Students need to be educated that neglecting the use of protective eyewear and gowns puts them at risk of infectious diseases through exposed membranes and skin. It is recommended that dental uniforms be worn only in clinical area and changed daily to prevent cross contamination.[18] Leivers et al. and Qureshi et al. suggested that the uniforms should be washed separately and stressed the importance of using disposable gowns.[19,20,6,21,22]

Jewellery items along with wrist watches must be removed prior to gloves placement as their presence compromises the size and integrity of gloves and promotes significant growth of skin microorganisms e.g. gram-negative bacilli and Staphylococcus aurous, and the concentration of organisms related with the number of rings worn, may harbour methicillin-resistant Staphylococcus aureus (MRSA).[23] Our study showed that removal of accessories before starting treatment was done mostly by the undergraduates (61.4%) whereas graduates and post-graduates showed lesser concern (50%).

After using prosthodontics items (Rubber bowl, mixing spatula, facebow, cutting/finishing burs), they must be cleaned and disinfected for every patient. Facebows and burs need to be sterilized. In this study, we noticed an increase in compliance for disinfection process in postgraduates. Spread of infection is associated with contact of human blood or saliva mixed with blood.[9] Ideally every object should be sterilized after its use on a patient but practically it is not possible. Most of the dental objects come under high level disinfection. Practice in the tertiary dental health care institution for disinfecting the items (dental cast, wax rims, dentures prosthesis, metal framework, face bow), is practiced by majority of undergraduates (51.1%) but majority of graduates and postgraduates do not. This may be attributed to negligence of the dentists which needs to be corrected. The absence of disinfection practice increases the possibility of transfer of pathogens to technicians, dentists and other co-workers. 84.1% of undergraduates, 96.2% of graduates and 100% of post graduates wash the dental impression first and then disinfect it.

An examination done by G Lynn Powell et al. reported 67% of the impressions, dentures, crowns, and wax rims inspected, indicated the presence of microorganisms depicting an immediate relationship between dental offices and microorganisms present.[24] 86% of students in our study were aware of chances of contamination of denture during finishing/polishing while 100% postgraduates were well-informed. Sterilization of metal stock trays was done by 87% of the examination test in one investigation while 80% of the dental specialists favoured purification over autoclave for sterilizing handpiece in another investigation.[2, 5, 7] 68.2% students distinctly checked the disinfection pocket before opening. A study showed that only 5.5% sterilize/disinfect their own wax knives routinely.[1] In our study 57.9% of students mentioned that they do not disinfect their own instruments while working on dentures of different patients. This low percentage of respondents

regarding disinfection of wax knife, carvers, and pliers poses a major concern for cross infection control and needs to be addressed in the future. Increased awareness towards disease control among study participants showed a gap between knowledge and practice.

Limitations of the study are small sample size and use of only one study centre.

Conclusion

The overall knowledge, attitude and performance of participants included in this study were found to be satisfactory. Wearing gloves and facemasks was significant but measures like protective eye wears, gowns and head gears were not strictly followed by dentists.

Recommendations

Workshops and awareness programs should be conducted from preclinical phase for undergraduate dental students, graduates and postgraduates. Direct observation of procedural skills should be made part of log books and assessed. In pre-clinical and clinical environment mini- clinical evaluation exercise should be included in dental curriculum and assessment blue prints, thus facilitating practical action in implementing sterilization and cross-infection protocol.

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