



KNOWLEDGE, ATTITUDE AND PRACTICE OF DENTAL LAB TECHNICIANS TOWARDS INFECTION CONTROL DURING THE COVID-19 PANDEMIC

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ABSTRACT

Background: Dental Auxiliaries, particularly the dental lab technicians have a high risk of cross-infection of COVID-19 due to the risk of inhalation of aerosolised particles while handling dental utilities.

Aim: To assess Knowledge, Attitude and Practice towards Infection Control during COVID-19 pandemic among dental lab technicians.

Materials And Methods: A cross-sectional survey was conducted using google forms among dental lab technicians. A total of 109 lab technicians participated in the survey. The questionnaire checked regarding the knowledge, attitude and practice of infection control measures: use of gloves, aprons, receiving and disinfection of impressions, webinars on COVID19, past experience of hepatitis B vaccination, etc. Data obtained was analysed using SPSS IBM software version 19.0, Chicago.

Results: The overall response of dental lab technicians towards the infection control was poor. Over 60% revealed that they carry the impressions in plastic cover and 66% answered that the impressions received were kept on the table. Almost 58% agreed that they did not receive manual of infection control amidst the pandemic. Over 42.3% agreed to not disinfect the received impressions. More than half, answered that they felt communication gap between dentists and lab technicians. Mere 14% agreed to disinfect the articulators, finishing and polishing instruments, etc. whereas only 15% used the necessary PPE while working. Majority of 79% agreed to not have attended webinar on infection control measures amidst the COVID-19 and only 40.4% agreed to disinfect the prosthesis before dispatch. Only 36.6% agreed to have a past experience of hepatitis B vaccination.

Conclusion: It is important to improve the knowledge, attitude and practice of the dental lab technicians towards infection control through continuing education programs.

KEYWORDS : COVID19, dental lab technicians, disinfection, knowledge, attitude, Practice

INTRODUCTION:

The field of dental sciences is diverse and is evolving at a faster pace. The infection control among dental lab technicians is an imperative issue in the dental practice especially when COVID19 is creating havoc around the globe. The oral cavity of an average healthy person harbors about 750 million microorganisms; therefore, it is a very important topic of discussion through the years [1].

Every procedure in dentistry involves the exposure to saliva/blood (direct mode) or through aerosols contaminated with saliva/blood (indirect mode) [2]. The dental laboratories are often too neglected as well as overlooked². Of all, the prosthodontic procedures offer routes for cross-infection by manipulation of specific items between the dental clinics and dental laboratories [3].

The impression trays, the impression material, are all in direct contact with the patient's mouth, saliva and blood². The 2019-nCoV is found to be present in the saliva of infected patients [4]. This increases the chance of spread of COVID19 among the dental laboratory staff and the clinician. The cross-contamination is bi-directional. Even dental laboratories could be a source. Pumice, a dental material used for polishing is also a source for contamination of several microorganisms that are not usually a part of oral flora. *Acinetobacter*, *Micrococcus*, *Pseudomonas*, *Moraxella* and *Alcaligenes* are some of the gram-negative bacilli found contaminated in pumice [5]. Hence, the lab technicians should disinfect the prosthesis before delivering it to the dental clinics.

The prosthesis should be disinfected both, before sending it

and after receiving it from the laboratories. To curb further spread of COVID19, WHO has released guidelines to be taken by all health workers and lab technicians. But in spite of constant efforts by various authoritative organizations, the hygiene in dental laboratories has been below the standards over the past years. Thus, universal precautions of disinfection have to be imposed on the dental laboratories and also assessment of the knowledge of disinfection among the lab technicians is equally important.

Therefore, this study aims to assess the knowledge, attitude and practice of dental lab technicians towards infection control in various dental laboratories in Chennai, India amidst the COVID19 pandemic.

MATERIALS AND METHODS:

A cross-sectional survey was conducted using a web-based survey instrument (google forms) to obtain responses from dental lab technicians around Chennai, Tamil Nadu during 3rd week of June 2020. A total of 109 lab technicians participated in the survey. The questionnaire contained 15 questions that checked regarding the knowledge, attitude and practice of infection control measures: use of gloves, aprons, receiving and disinfection of impressions, webinars on COVID19, past experience of hepatitis B vaccination, etc. Apart from this, their work experience and gender were also asked. This questionnaire was self-administered and pilot studied to assess the clarity and relevance of questions.

Statistical Analysis:

Data was entered in Microsoft excel and later imported to SPSS IBM software tool (version 19, IBM Chicago) for statistical analysis.

RESULTS:

A total of 109 lab technicians participated in the study. Out of which, 56% were male and 44% were female lab technicians. 49.5% of lab technicians had less than 5 years of experience and 50.5% had more than 5 years of experience (Chart 1). The study revealed that 65% lab attendants and 24% lab technicians carried the impressions to the laboratories, usually. While 11% received it through post/courier. A majority of 72% agreed that they were aware of the infection control protocols to be followed whereas 60% of the lab technicians revealed that they used plastic cover, 30% used cardboard box and 10% used other means to carry the impressions (Chart 2). The present study revealed that 36% received it using bare hands, 45% used gloved hands and 19% used other means to receive the impressions in the laboratory.

Regarding storage of the impressions, 34% agreed to store it in the sterile pouch whereas 66% kept it on the table once received. It was found that 42% agreed to receive a manual that gives infection control protocols of COVID19 whereas 58% said that they did not receive (Chart 3). The study also revealed that 42.30% did not disinfect the received impressions whereas 57.7% agreed to disinfect it. Regarding Communication to the dentist, 45% agreed that their dentist has communicated about the disinfection protocols to be followed whereas 55% said no to this question. It was found that 30% agreed to use mouth mask only, 34% agreed to use mouth mask and gloves, 21% agreed to use mouth mask, gloves and eye shields whereas only 15% used mouth masks, gloves, eye shields and aprons while working (Chart 4). Also, mere 14% agreed to disinfect the articulators, finishing and polishing instruments whereas 86% said that they do not practice to disinfect the same. Only 36.60% agreed to have a past experience of vaccination against Hepatitis B whereas 33.90% do not remember and 29.50% said a no to this question. The study found that 75% lab technicians change the pumice slurry periodically whereas 25% do not follow the practice (Chart5). Regarding the webinars, majority of 79% lab technicians agreed that they did not attend webinars on the risks of cross-infection amidst COVID19 while 21% agreed to have attended such webinars. The study revealed that 59.60% do not disinfect the prosthesis before dispatching while 40.4% do agree to disinfect. When asked regarding the functioning of the laboratories, 64.40% lab technicians agreed to not work amidst the lock down while over 35.60% agreed to work (Chart 6)

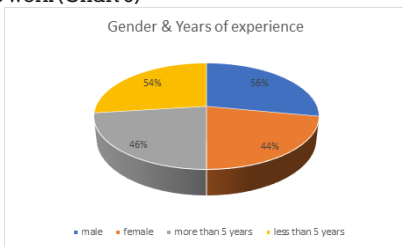


Chart 1 Pie chart depicts the gender distribution and years of experience among lab technicians.

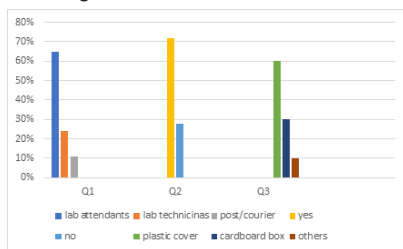


Chart 2 Results to **Question 1:** Who carries the impressions to the laboratory from dental clinic? **Question 2:** Are you aware of the infection control methods for COVID19? **Question 3:** What is used to carry the impressions to the laboratory?

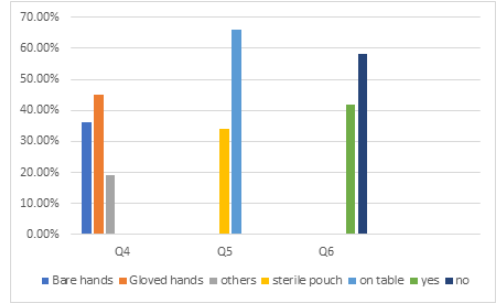


Chart 3 Results to **Question 4:** What have you been using to receive the impressions? **Question 5:** Where was the impression kept after receiving? **Question 6:** Have you received any manual that gives information on infection control protocols of COVID19?

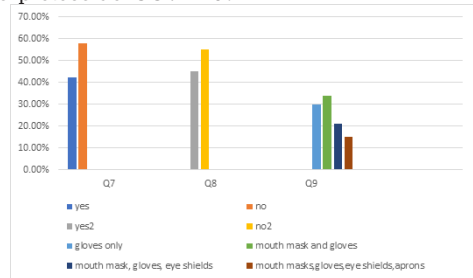
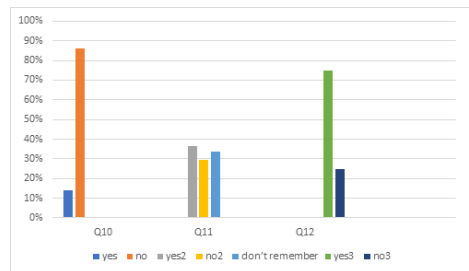


Chart 4 Results to **Question 7:** Are the received impressions disinfected? **Question 8:** Has your dentist communicated to you regarding any of the disinfection protocols to be followed? **Question 9:** What frequently do you use while working?



Graph 5 Results to **Question 10:** Do you disinfect the face bow, articulators, finishing and polishing instruments? **Question 11:** Is there any experience of vaccination against Hepatitis B? **Question 12:** Is there a practice of changing pumice slurry, periodically?

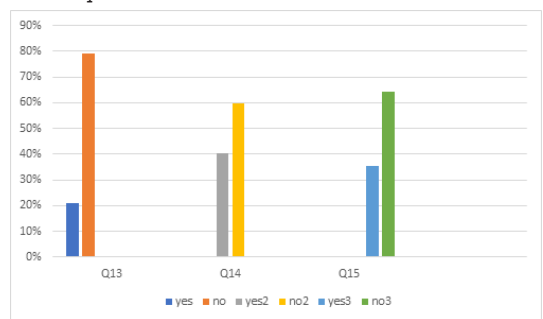


Chart 6 Results to **Question 13:** Have you attended webinars on the risks of cross-infection amidst COVID19? **Question 14:** Are the prosthesis disinfected before dispatching? **Question 15:** Are you still working amidst the nation-wide lockdown?

DISCUSSION:

The topic of lab technicians and the disinfection protocol they follow is important for discussion to the bench because there are instances where the lab technicians have acquired infection handling contaminated impressions and prosthesis [6]. There are certain guidelines laid down for the dental

laboratories to follow in order to prevent cross-infection. But the technicians do not follow it, vigilantly [7]. It is in the context, that the prevalence of occupational hazard is 15.4% among lab technicians [8]. The impressions are a good source of infection as they carry a wide range of bacteria, virus, fungi [9]. Hence, patient-to-technician and vice-versa cross-transmission certainly exists. The present hour is worried about the transmission of COVID19 by lethargy of the clinicians and the lab technicians if the disinfection of the impressions and the prosthesis is not followed strictly.

This survey evaluated the infection control measures and practice among dental lab technicians across Chennai, India. In the present study, 72% of dental technicians were aware of the infection control methods for COVID19. On enquiring on who carries the impressions to the laboratory, it was found that 65% were lab attendants, 24% were lab technicians themselves and 11% were sent via post/courier. Over 60% of them agreed that they carry impressions in a plastic cover and 30% said that they used card board boxes. The occupational safety and Health Administration (OSHA) declare that the materials which are highly potential to cause infection shall be placed and color coded or labelled in a container which will prevent the leakage. Abdulsalam Khalil Ezzat., *et al.* [10] conducted the study among lab technicians in the city of Jeddah in Saudi Arabia revealed that 61.5% of lab technicians were knowledgeable about proper infection control methods whereas Al-Kheraif and Mobarak [11] found that only 12.5% of lab technicians aware of the infection control procedure, in Riyadh. They suggested that it was mandatory to include the training program on infection control to the lab technicians either in the course or before they are appointed jobs. It was also very important that everyone follows a standard set of rules and guidelines. About 36% of dental technicians reported that they receive impressions using bare hands, 45% used gloved hands and 19% used other means to receive them. Bhat., *et al* [12], stressed upon the importance of barrier system to be followed in the laboratories routinely. Hand hygiene is also a must to be followed before and after removing the gloves. N95 respirators or equivalent, disposable gloves, aprons and eye shields are to be worn if trimmers, lathes and rotary equipments are used [13]. On enquiring about the storage area of the impressions, 66% said that they keep it on the table. According to Sammy KC and Benjamin SN [14] and Kaul., *et al* [15] in their study, revealed that it was essential to have a separate disinfection area for the impressions and prosthesis received from clinics and the area must have a poster eliciting the infection control policy to be followed in precise. Almost, 58% of the lab technicians said that they did not receive any manual discussing information on infection control protocols for COVID19. It is highly recommended that a manual of a standard organization (CDC, OSHA, ADA) be kept in the laboratories, so that the personnel refer them during emergency and also in the routine practice.

57.7% of the technicians agreed to not disinfect the impressions once received in the laboratories. Begum, Aleya., *et al* [16], in their study stressed that the impressions and prosthetic appliance have to be disinfected with proper disinfecting agent. Prior to its disinfection, the impressions have to be washed in running water to remove all the visible contaminants. 5% phenol, 2% glutaraldehyde and iodophor sprays are found to be effective for the same. Immersion of impressions is advised over spraying. It is thus, mandatory for the clinician and the dental lab technician to disinfect the impressions and prosthesis before and after the transportation. Regarding the communication between the clinician and the lab technicians on the infection control methods, 45% agreed to communicate with the dentists. Kohli and Puttaiah [17] mentioned that it is essential for the items dispatched to have a label which states if it was disinfected and with which disinfectant. There must be an adequate talk between the

dentist and technician so as to exchange knowledge that is missed often. This hour compulsorily calls upon the clinicians to impose strict rules on the lab technicians pertaining to the disinfection to be followed. Regarding the use of personal protective equipment (PPE) while working, 30% of technicians said that they wear only gloves while 34% said they use both mouth mask and gloves, 21% agreed for using mouth mask, gloves, eye shields and 15% agreed to use mouth mask, gloves, eye shield and apron. It is in the literature that gloves and apron prevent cross-contamination while mouth mask prevents the inhalation of aerosols of size as small as 50 microns. Just 14% of lab technicians agreed to disinfecting the face bow, articulators and polishing instruments. Bhat., *et al*, assessed that all the laboratory equipments such as polishing lathes, burs, rag wheels, brushes, articulators have to be heat sterilized or disinfected after each use or discarded. Nearly, 36.6% of the technicians agreed to have experienced hepatitis B vaccination in the past whereas 33.9% don't remember it at all and over 29.5% declare clearly 'No' to the question. It is in the literature that approximately there are 400 million HBV (Hepatitis B Virus) carriers and in India there are about 30 million carriers. Hence the prevalence rate roughly is 3%-6% in India [18]. It is proven that HBV can survive in dried blood for about a week [19]. Not just HBV but there is an equal risk to HIV (Human Immunodeficiency Virus), TB (Tuberculosis) caused by *Mycobacterium tuberculosis*. It is evidence-based result that HIV viral particle could be isolated from saliva of an infected individual and

Mycobacterium tuberculosis could survive several weeks on the non-disinfected impressions and equipments [20]. Thus, it is mandatory for the dental clinicians and the lab technicians to get immunized for the same. Regarding the disposal of pumice slurry, 75% of dental technicians said that they change pumice slurry periodically or at regular intervals. It is evident in the literature that pumice slurry is the most contagious and is highly potent for cross-infection. The pumice slurry must be changed daily and disinfectant has to be added after each use [21]. On enquiring if whether there was a webinar on risks associated with COVID19, 79% of the dental lab technicians said that they did not have such event. It is thus highly important for the dental institutions and committee of the dental lab technicians to frequently host events that would update and encourage lab technicians to follow rules and regulations amidst the global health emergency. 64.40% agreed to not work amidst the lockdown whereas 35.60% lab technicians still work during this global emergency. Nearly, 59.6% of the lab technicians agreed to not disinfect the prosthesis before sending it to the clinic. Now, this becomes the source of infection to the patient from laboratory. In the previous reports it is recorded that >60% of the prosthesis dispatched from the laboratories were contaminated with pathogens [22]. It is mandatory for all the technicians to disinfect the prosthesis before sending it to the clinicians. CDC recommends that all patients must be looked as potentially infectious and therefore utmost precautions need to be followed [23]. Most commonly used disinfectants are ethyl alcohol, iodophors and iodine, chlorines, phenols, glutaraldehyde, isopropyl alcohol and quaternary ammonium compounds [24].

There is a lot of research to be done in this genre. There are many dental laboratories being run in India with unqualified laboratory technicians. Hence a more intensive and comparative study with the sophisticated dental laboratories has to be done to assess the level of application of knowledge in the practice. Maximum lab technicians have to be included in further studies to get a better picture.

CONCLUSION:

As we are aware that COVID19 has already swept the entire globe, it's high time that we do not give further chance for its

transmission. Lab technicians are at an equal risk as the clinicians. Having the limitations in the current study, we conclude that most of the dental technicians do not follow the guidelines either taught to them or preached by the dental associations. Further there has to be bi-directional flow of knowledge between the clinicians and the technicians. Proper check has to be maintained by the clinician on disinfection protocols. It is also the duty of the clinician to disinfect the impressions or prosthesis before sending it to the laboratory. Meanwhile, a standard protocol has to be implemented in all the laboratories across the country. A separate bench which controls the dental lab technicians has to be formed to have a keen assessment of the level of their practice. Many conferences and events have to be conducted by the dental institutions to build a rapport with the technicians. This will not only update the technicians but also provide a platform to exchange views.

LIMITATIONS OF THE STUDY:

The questionnaire does not include the method of disinfection used by the technicians and it does not assess an exact knowledge of the technicians. The knowledge on disinfection of the received impressions from clinics is also not assessed. Thus, further studies have to be planned keeping this in mind.

ACKNOWLEDGEMENT: None

CONFLICT OF INTEREST: None declared

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