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Original Article

A Cross Sectional Survey about Awareness and Current Status Regarding Infection Control in Dental Laboratories in and around Hyderabad

Namratha Chandrahari[1], Prathiba N[2], Priyanka R[3], Mansha Saxena[4]

[1,2]Senior lecturer, [3,4]Post graduate, Department of Prosthodontics Crown & Bridge, Government Dental College & Hospital, Hyderabad, Telangana, India

ABSTRACT

Background: Dentistry is predominantly a field of surgery, involving exposure to blood and other potentially infectious materials and therefore requires a high standard of infection control and safety practice in controlling cross-contamination and occupational exposures to blood- and saliva-borne diseases. **Aim:** To assess the knowledge, attitude, and behaviour of dental technicians toward infection control practised by them in dental laboratories in and around Hyderabad, India. **Materials and Methods:** We carried out a cross sectional survey of dental laboratories in dental colleges of South India. A self administered questionnaire containing seven closed ended and nine open ended questions was randomly distributed to laboratory technicians in 50 laboratories in and around Hyderabad, India, regarding their attitude and knowledge of infection control measures like the use of gloves, protective eyeglasses, receiving of impression in laboratory, disinfection of impression etc. **Results:** The response showed that most of the dental technicians receive 25-35 (35%) in a week. We found that most of the laboratory attendants carry impressions in plastic bag (90%) to the laboratory. Only 30% of the dental technicians said that they were aware of infection control protocol. Only 12 % of the technicians told that they receive impressions while wearing gloves. **Conclusion:** We concluded that most of the dental technicians were not aware of the basic infection control protocols.

Key words: Disinfection, Impression, Dental Institutes, Infection Control, Laboratory Technicians.

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Corresponding Author: Dr. Namratha Chandrahari, Senior lecturer, Department of Prosthodontics Crown & Bridge, Government Dental College & Hospital, Hyderabad, Telangana, India

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INTRODUCTION:

The dental laboratory is often overlooked when planning effective infection control and exposure control measures. Technicians are particularly vulnerable to microbial cross-contamination from the impressions they receive from dental offices and institutes. Casts poured from impressions can also harbour infectious microorganisms that can be distributed throughout the laboratory when the casts or dies are trimmed.[1, 2]

Dental laboratories including those in clinics and dental institutes should be isolated from the possible transmission of pathogens or be properly prepared to prevent cross-contamination between patients and dental technicians. It is essential that all dental laboratory technicians must have a basic understanding of infection transmission and be properly evaluated for the exposure risk they face from blood-borne pathogens. Contact with blood or saliva mixed with blood may transmit pathogenic microorganisms. Impressions, casts, impression trays, record bases, occlusal rims, articulators and dental prostheses can all transmit pathogenic microorganisms from the dental office to the dental laboratory. It is reported that 1 ml of saliva sample from the mouth of an average healthy person contains about 750 million microorganisms. Studies have reported that organisms are transmitted from impressions to casts and from dentures to pumice, where they continue to live.[2-5]

In 1987, the Centers for Disease Control and Prevention (CDC) developed universal precautions to help protect both health care workers (HCWs) and patients from infection with blood borne pathogens in health care settings. It is important to evaluate the knowledge of dental technicians regarding the disinfection and personal protection along with their motivation for the implementation of same.[5, 6]

Very few studies have been carried out regarding the knowledge of infection control among dental technicians. **Gupta et al (2017)**[6] carried such study in

North India. Ours is first study in laboratories in Hyderabad. The purpose of the study was to assess the knowledge, attitude, and behaviour of dental technicians toward infection control practised by them in dental laboratories in and around Hyderabad, India.

MATERIALS AND METHODS:

We carried out a cross sectional survey of dental laboratories in 50 dental laboratories in and around Hyderabad, India, after obtaining ethical clearance. Informed consent was obtained from technicians before the commencement of survey. Data were collected during January 2017-October 2017.

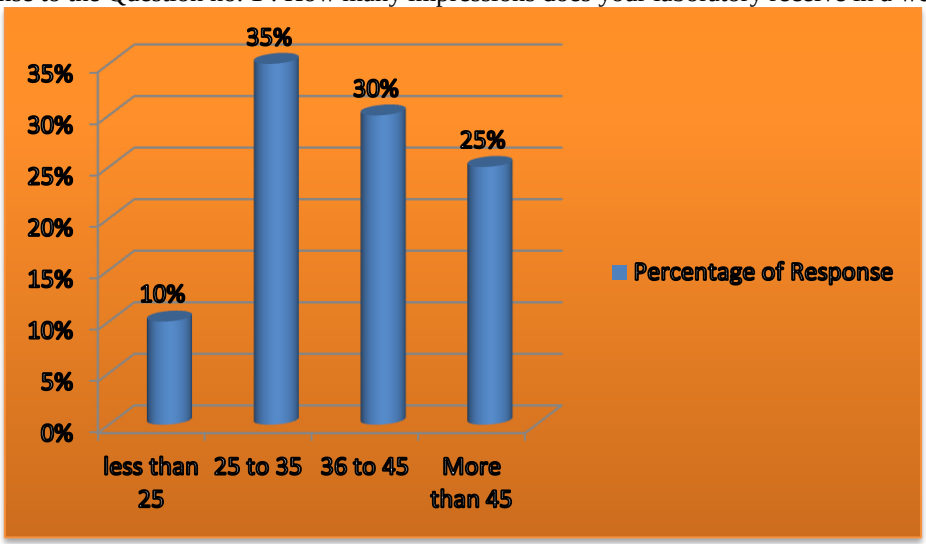
A self administered questionnaire based on **Gupta et al (2017)**[6] containing seven closed- ended and nine open ended questions was randomly distributed to laboratory technicians and answered questionnaires were collected.

RESULTS:

Dental technicians from 50 dental laboratories were contacted and information collected from them in the form of answered questionnaires. The obtained data were analyzed, and results have been presented with graphical presentation for ease of understanding.

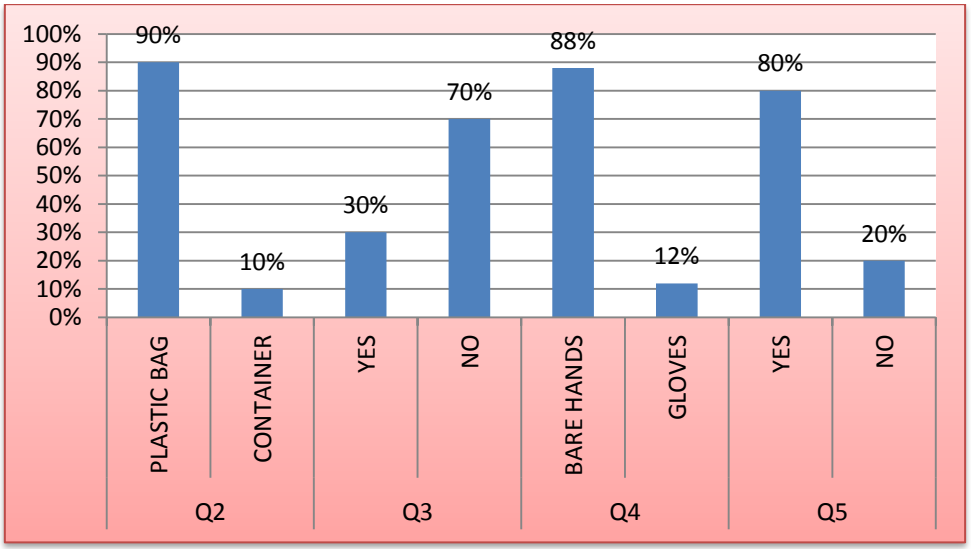
The response showed that most of the dental technicians receive 25-35 (35%) in a week **(Graph 1)**.

Graph 1: Response to the Question no. 1 : How many impressions does your laboratory receive in a week?



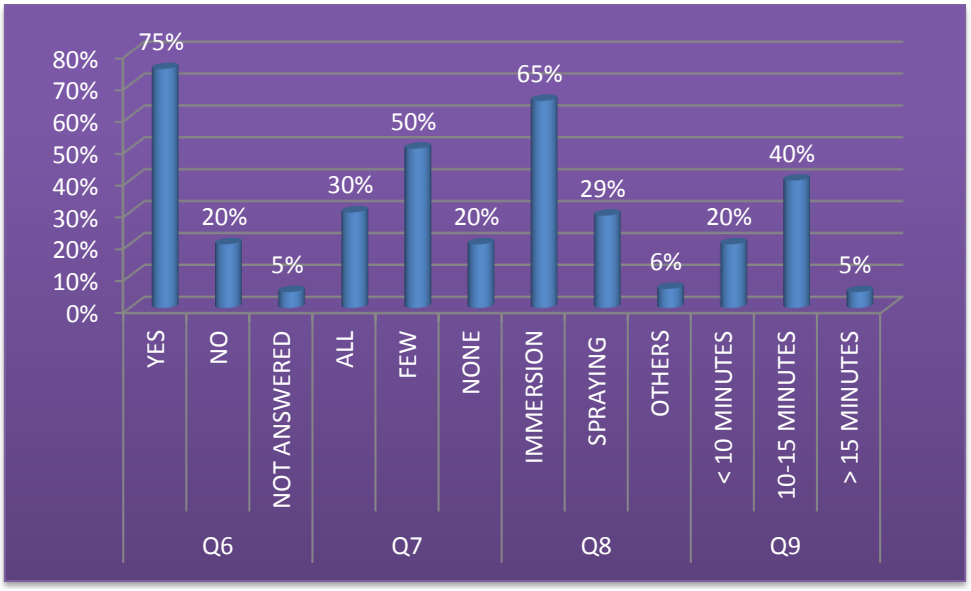
We found that most of the laboratory attendants carry impressions in plastic bag (90%) to the laboratory. Only 30% of the dental technicians said that they were aware of infection control protocol. Only 12 % of the technicians told that they receive impressions while wearing gloves. About 80% of the institutes had a separate receiving area in the laboratories **(Graph 2)**.

Graph 2: Response to Question 2: How does laboratory attendant carry impressions from dental clinic to the laboratory? Question 3: Are you aware about the various infection control measures to be taken into practice? Question 4: How do you receive impression or prosthesis in the laboratory? Question 5: Does your laboratory have a separate receiving area?



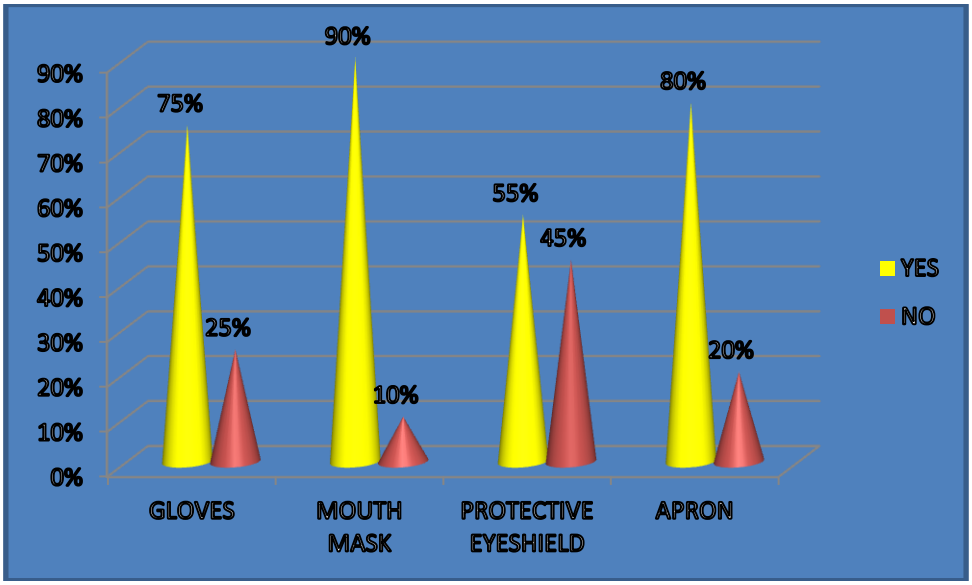
Nearly 75% of the technicians said that they communicate with the doctor regarding the disinfection of impression/prosthesis received in the laboratory. Only 30% of the dental technicians responded that they disinfect all the impressions. Immersion was the method used for disinfection of impressions by the maximum technicians (65%). Most of them (40%) responded that they immerse impressions for 10 -15 minutes for disinfection **[Graph 3]**.

Graph 3: Response to Question 6: Is there any communication between you and the dentist regarding the disinfection of impression/prosthesis received in the laboratory? Question 7: Do you disinfect the impressions received in the laboratory? Question 8: If you disinfect the impressions then what is the mode of disinfection of the impressions? Question 9: If immersion is the method used for disinfection then the duration of time employed for the same is?



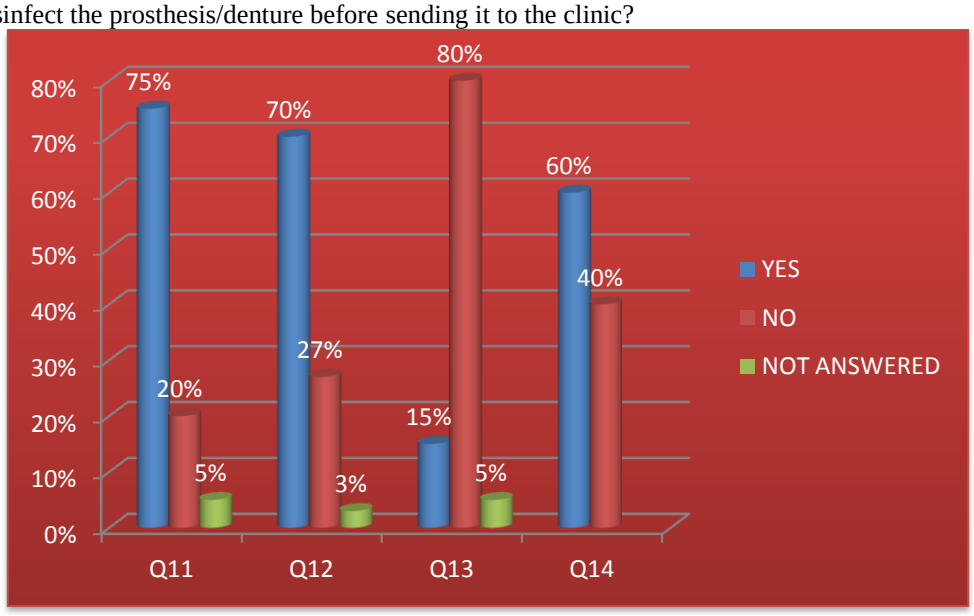
Regarding protective wears 75% said that they use gloves, 90% said that they use mouth masks, 55% told that they wear eye shields, and 80% said that they wear aprons while working **[Graph 4]**.

Graph 4: Response to Question 10: Regarding the use of protective wares while working in the laboratory?



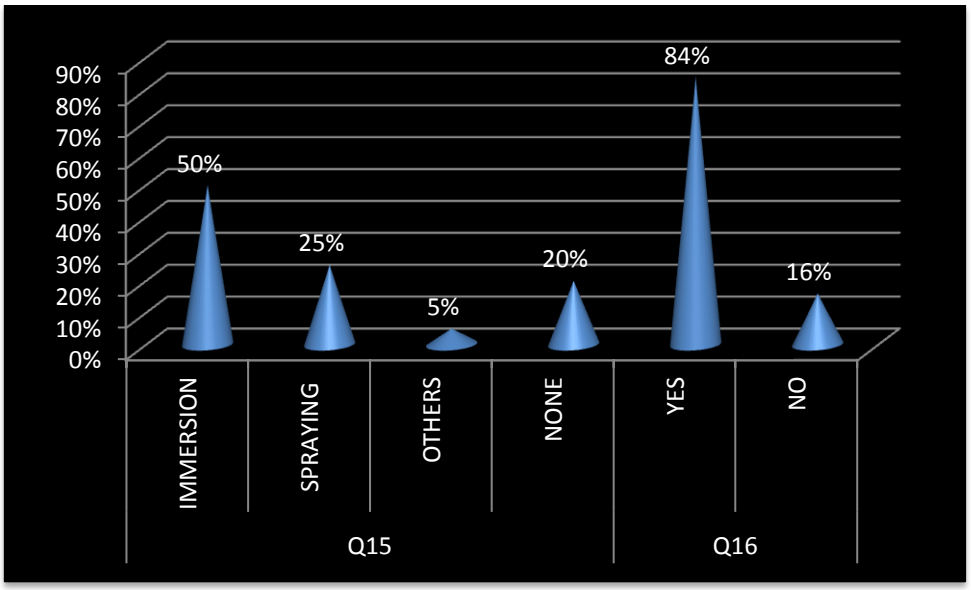
Most of the technicians received vaccination against hepatitis B virus (HBV) (75%). Majority of the technicians (70%) stated that they change pumice slurry after regular intervals and 80% said that they do not add any disinfectant. About 15% of technicians said that they disinfect the prosthesis/denture before sending it to the clinic **[Graph 5]**.

Graph 5: Response to Question 11: Have you received vaccination against hepatitis B virus? Question 12: Do you change pumice slurry after regular intervals? Question 13: Do you add any disinfectant to the pumice slurry? Question 14: Do you disinfect the prosthesis/denture before sending it to the clinic?



Most of them (50%) disinfect them by immersion technique. About disposal of waste, 84% said that they dispose the waste properly **[Graph 6]**.

Graph 6: Response to Question 15: What mode do you employ for disinfecting the prosthesis/denture in the laboratory? Question 16: Do you use proper disposal system for waste in the laboratory?



DISCUSSION:

Dentistry is predominantly a field of surgery, involving exposure to saliva/blood and other potentially infectious materials, and therefore, requires a high standard of infection control and safety in controlling cross contamination and occupational exposures to blood and saliva borne diseases. Dental care professionals are at an increased risk of cross infections while treating patients. However, in contrast to the dental treatment rooms and surgical operatories where infection control measures are

rigidly recommended, the dental laboratories are often overlooked. The Occupational Safety and Health Administration (OSHA) has given specifications for handling and transporting specimens of blood contaminated or other potentially infectious materials. According to it, "potentially infectious materials shall be placed in a container which prevents leakage. Labeling or color coding is required when such specimens/containers leave the facility."[4-6]

90 % of the dental technicians told that they received impressions in plastic bags, which is similar to **Gupta et al (2017)** who found 96.15% of dental technicians received impressions in plastic bags.[6]

Regarding awareness about the various infection control measures to be taken into practice, only 30% of technicians said that they were aware of it. **Gupta et al (2017)**[6] found 25 % knew about measures, whereas **Al-Kheraif and Mobarak** found that 87.5% of the respondents were unaware and did not follow any infection control procedure. They suggested that it should be mandatory to provide formal infection control courses for the dental technicians in the dental institutes either as a part of their training or before the appointment in the institutes. Furthermore, they should be motivated to follow a single set of standard precautions assuming every patient as a source of infection.[7]

75% reported that they receive impressions while wearing gloves. **Gupta et al (2017)**[6] reported 55.76% received wearing gloves, **Bhat et al (2007)** assessed that barrier system must be followed routinely in the laboratory. Disposable gloves should always be used. The gloves should be disposed off appropriately after each use. Hands should be washed before and after removing gloves.[8]

80% of the dental technician responded that they have separate receiving areas in their laboratories. **Gupta et al (2017)**[6] and **Kaul et al (2012)**[9] found 61.53% and 56% had separate area respectively. Regarding communication between technicians and the doctor about the disinfection of impression/prosthesis received in the laboratory, 75% of the dental technicians answered that they communicate with doctors, whereas it was 71.15% in the study by **Gupta et al (2017)**[6].

About the disinfection of the impressions received in the laboratory, only 30% of dental technicians responded that they disinfect all the impressions they receive from clinics, similar to **Gupta et al** (30.76%).[6] The results showed that there is a lack of awareness among technicians toward disinfection of impressions. **Marya et al (2011)** suggested that it is essential for the laboratory technicians to disinfect all the impressions just to assure their own protection from infection.[10]

Regarding the method used for the disinfection of impressions, 65% of dental technicians answered immersion as the method of choice while 29% answered spraying. **Kaul et al** stated that immersion method is preferred over the spraying as it assures constant contact of disinfectant with all surfaces of the impression. They advocated disinfection of all the impressions with an acceptable disinfectant either with spraying or immersion.[9]

We found most of them (40%) responded that they immerse impressions for 10 -15 minutes for disinfection Whereas Gupta et al found 38.46% of dental technicians answered that they immerse impressions for 10 minutes. The results revealed that technicians were not aware of the actual time duration for which disinfection has to be done and they were not following any standard protocol of disinfecting impressions.[6] **Kugel et al (2000)** said that most of dentists and laboratories disinfect impressions for longer than recommended durations. The ideal time duration for disinfection of the impression was 10 minutes. The ADA recommended the use of ADA accepted disinfectant that requires no more than 30 minutes for disinfection.[11]

Primary PPE (protective eyewear and face shields) used in oral health‐ care settings includes gloves, surgical masks, protective eyewear, face shields, and protective clothing. All PPEs should be removed before dental health care providers leave patient care area. Reusable PPE should be cleaned with soap and water when visibly soiled, according to the manufacturer's directions. Wearing gloves, surgical masks, protective eyewear, and protective clothing in specified circumstances to reduce the risk of exposures to saliva/blood borne pathogens were mandated by OSHA.

Regarding the use of personal protective equipment (PPE) while working in the laboratory, our finding was similar to **Gupta et al**. 75 % of dental technicians said that they wear gloves while 90% of dental technicians answered that they wear mouth masks. Furthermore, 80% of the dental technicians told that they wear aprons, and only 55% of the dental technicians answered that they use eye shield while working in laboratory.[6, 12]

75% of dental technicians said that they have received vaccination against HBV. Whereas **Gupta et al** found it to be 78.84%. The immunization against HBV forms the main disciple against infection control and personal protection. Almost all of the studies regarding infection control advocated the immunization of dentist as well as his team including technicians. In 1987, the Center for Disease Control and Prevention developed universal precautions to help protect both HCWs and patients from infection with blood‐ borne pathogens in health care settings.[6]

70 % of dental technicians said that they change pumice slurry on regular intervals in their dental laboratories. **Gupta et al**[6] found it to be 69.23%. The US Army Dental Care System said that pumice solution should be made by suspending the pumice in tincture of green soap or other surfactant and adding an effective disinfectant solution to the mix. The pumice must be changed daily, and the machines must be disinfected on a regular basis.[13]

Only 15% of dental technicians said that they add disinfectant to it. **Gupta et al**[6] found it to be 19.23%. **Firoozeh et al** said that pumice used in prostheses polishing could be a potential source of contamination to

dental laboratory technicians when considering the wide variety of microorganisms in saliva and blood of patients. They promoted the use of sterile pumice or association of disinfectants to the pumice (0.2% chlorhexidine gluconate or 5% hypochlorite sodium). They also recommend a daily change of polishing paste.[14]

Regarding disposal system for waste in the laboratory, 80% of dental technicians answered that they use proper waste disposal system in laboratories. **Kohli and Puttaiah** in their text book on infection control mentioned that, while protecting the patient and the care provider, a lot of medical waste is generated. With respect to dentistry, waste can be classified as regulated waste and nonregulated waste. The clinics should have a contract with a professional waste management company that regularly removes the hazardous waste from the clinic. Chemical wastes should not be poured down the drain as they pose a grave environmental hazard.[15]

In future, studies should focus on dental laboratories in dental institutes and also private sectors as well as laboratories associated with dental clinics to get a better picture regarding various infection control measures taken by dental laboratories so that the area or aspect most ignored can be fetched and worked on.

CONCLUSION

Within the limitations of the current study, we concluded that most of the dental technicians were not aware of the basic infection control protocols. A single set of standard precautions in accordance with the CDC and OSHA guidelines should be mandatory for all the dental laboratories. Further study should be planned including more objective questions pertaining to disinfection of articulator, facebow, and trimmer etc.

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