

An Epidemiological Study to Assess Knowledge and Preventive Approaches Followed by Dental Practitioners to Avoid the Nosocomial Spread of COVID-19 With Special Emphasis on Prosthodontics Related Work

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ABSTRACT

Aim: Since its emergence in December 2019, Corona Virus Disease 2019 (COVID-19) has gripped the entire healthcare system of the world, including dental community. Due to the characteristics of dental settings and procedures, the risk of cross infection is quite high between patients and dental practitioners. Considering the need of various preventive measures in a clinical setup, an epidemiological study was conducted in the department of Prosthodontics and Crown & Bridge, Indira Gandhi Government Dental College and Hospital, Jammu. This study was aimed at highlighting awareness regarding COVID-19 among dental practitioners and various preventive approaches followed by them in their clinical setups to prevent transmission of COVID-19 during general patient management and procedures particularly in context to Prosthodontics.

Materials & Methods: A self-structured questionnaire was sent to dental practitioners working in government and private setup via social media using Facebook, WhatsApp and e-mails. The responses were received through online survey submission.

Results and Conclusion: The results were statistically analyzed using SPSS version 25. It was reported that 100% of the dental practitioners were fully aware of the COVID-19 symptoms, modes of transmission and are also updated with the guidelines by concerned authorities. Most of the dentists were using adequate precautions in the form of PPE, face masks, oral antimicrobial rinses, disinfectants for surfaces and clinical areas.

Clinical significance: This survey has provided significant data related to management protocols and specific preventive measures that can be implemented during an outbreak of such infectious disease in future.

Keywords: COVID-19, Dentistry, Prosthodontics, Dental practice, Infection control

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INTRODUCTION

From the beginning of 2020, a new pathogen spread from China to other countries across the globe within a short period.¹ On January 31, 2020, the WHO declared it as a Public Health Emergency of International Concerns and on March 11, it was reported a Global Pandemic.² This newly detected, highly infective, and super spreading pathogen is a Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2) virus. The disease caused by this virus is termed Coronavirus disease 2019 (COVID-19).¹ This virus mainly spreads when an infected person is in close contact with another person. Transmission is primarily by droplet spread or aerosol transmission from an infected person's nose and mouth as they breathe, cough, sneeze or speak.³

In India, more than 10 million people are affected by COVID19. COVID19 has drastically affected every sector of the country, but the healthcare sector is the most severely hit. It has caused an emergency status in the healthcare system, including the Dental community. Health care professionals are continuously exposed to a higher risk of getting infected while serving their duties. Due to the characteristics of dental settings and procedures, the risk of cross-infection is relatively high between patients and dental practitioners.⁴ considering the rapid spread of COVID19; various authorities have highlighted the

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dentists' essential measures during patient management. However, as unlocking phases in India have led to the resumption of dental services other than emergencies, most dentists may not be aware of the recent guidelines. Therefore, we have conducted a questionnaire-based study. The study aimed to evaluate various preventive measures followed by dental practitioners to prevent the nosocomial spread of COVID19, emphasizing Prosthodontics related work.

MATERIALS AND METHODS

The present epidemiological study was conducted in the Department of Prosthodontics and Crown & Bridge, using a self-structured questionnaire-based online survey designed at www.docs.google.com. The survey link was circulated through social media using Facebook and WhatsApp and emails to dental professionals. The survey was kept open for about two months, and the responses were received through online survey submission.

INCLUSION CRITERIA:

1. Dental practitioners having BDS/MDS degrees.
2. Dental practitioners working in Government/Private setup.

EXCLUSION CRITERIA:

1. Non-practicing dentists.
2. Dental assistants/hygienists.

The questionnaire comprised 35 questions, divided into two sections. The first section was based on general dental practice, and the second section was based on Prosthodontic procedures. An Institutional Ethical Committee approved the study, and the statistical analysis was done on SPSS version²⁵.

RESULTS

The questionnaire was sent to 400 dentists, and 172 participated and submitted the complete questionnaire. Most participants were aged between 25-40 years (92.4%), while only 7.6% were between 40-50 years. 52.3% of dentists had a BDS degree, whereas 47.7% were MDS in various disciplines. Most of the dental practitioners had less than five years of clinical experience (76.7%), some had the clinical experience of 5-10 years (14%), while very few had a clinical experience of more than ten years (9.3%). Many dentists (68%) worked in government institutions, whereas 22.7% worked in private dental setups. Some of the questions and results are given in Table 1.

TABLE 1: Some of the questions and results from the questionnaire

Questions	Results (in %)	
	Yes	No
1 Are you aware of the symptoms of COVID-19?	100	
2 Are you aware of the modes of transmission of COVID-19?	100	
3 Are you updated with the current WHO or DCI guidelines for dental professionals regarding COVID - 19 from time to time?	93.6	6.4
4 Are you aware of which authority to contact in your vicinity or institution if you come across suspected Covid-19 patients?	93	7
5 Are you currently treating patients at your workplace?	87.2	12.8
6 Are you telephonically available for all your patients?	86.6	13.4
7 Have you made changes in your patient waiting area according to the guideline given by competent authority?	95.9	4.1
8 Do you ask every patient to rinse his/her mouth with antimicrobial oral rinses?	86	14
9 Do you use rubber dam isolation for patients?	28.5	71.5
10 Are you using high volume suction for every patient?	43	57
11 Are you using anti retraction valve or anti retraction hand pieces in your workplace?	31.4	68.6
12 Do you wash hand with soap and water / use sanitizer before and after treatment of every patient?	100	
13 Are you using any method to remove/ filter contaminated air from the treatment area?	58.1	41.9
14 Are you disposing PPE kits according to the guidelines given by MoHFW?	90.7	9.3
15 Are you managing waste generated in the clinic according to the CPCB guidelines?	89.5	10.5
16 Before closing the workplace, are you following protocol for disinfection given by competent authorities?	90.1	9.9
17 Are you treating elderly patient with other medical condition arriving for prosthodontic needs?	54.1	45.9
18 Are you taking digital impression or any other digital prosthodontic techniques in your clinic?	5.2	94.8

DISCUSSION

The present study reported the various preventive measures taken by dentists during the COVID-19 outbreak. For this purpose, a questionnaire was used to gather information about different approaches used by dentists to prevent the nosocomial spread of COVID-19. As it has been established that the primary route of transmission of COVID-19 is through droplets and aerosols, this has enhanced the likelihood of dental practitioners getting infected during routine clinical practice and vice-versa.⁵

The current study focused on the awareness regarding COVID-19 among dental practitioners and found that all the dentists (100%) were aware of the symptoms and modes of transmission of COVID-19. The present study found that most dentists (87.2%) have resumed their clinical practice after unlocking phases and are currently treating selective patients at their workplace. Also, most dentists are available telephonically for their patients in an emergency. Tele dentistry has become an essential tool for providing care to patients during this pandemic. It allows patients to connect with dentists sparing time and cost.⁴ Media has played a very vital role in making the general public aware of the COVID-19 symptoms, transmission, and the precautions to be followed, and so was the role of concerning authorities such as WHO and DCI, which were continuously active and updating various guidelines regarding the key measures to be taken by dentists during routine dental practice which is helping the dental community of India to combat this new pathogen in daily practice.⁶ The majority of dentists (93.6%) were updated with the guidelines of WHO or DCI from time to time. Most of the dentists (58.7%) had an assistant at their workplace and practiced four-handed dentistry. The four-handed technique is beneficial for controlling infection and cross-contamination during clinical practice.⁷

As is the routine, dentists usually take a thorough medical history from each patient and confirm the patient's general health. During this outbreak, it has become mandatory to screen patients at the time of arrival. This study found that most dentists ask about travel history symptoms regarding COVID-19 and take body temperature readings using infrared thermometers. Preventive measures start right from the entry of the patients into the clinic, and for this purpose, most dental practitioners have made changes in their

waiting areas. Indian Dental Association has recommended posting visual alerts icons and posters in the waiting rooms to instruct patients about hand hygiene, cough etiquettes and respiratory hygiene. The waiting area should be well ventilated. All non-essential objects such as magazines and toys should be removed from the waiting area.² It was found through the study that most of the dental practitioners are performing only emergency and urgent procedures, and only a few are performing all the dental operations, including aerosol-generating procedures. Ministry of Health and Family Welfare, Government of India, has given a list of emergency and urgent dental procedures during this outbreak.⁸

As this study was conducted with particular emphasis on Prosthodontics related work, it was reported that only 54.1% of dentists are treating elderly patients arriving for Prosthodontic procedures. As the elderly group is more vulnerable and at a high risk of getting infected with COVID-19, this can be a reason for a smaller number of dentists treating elderly patients. Also, most dentists perform only emergency Prosthodontic procedures such as repairing the broken prosthesis, relining and rebasing, recommending dislodged crown or bridges, trimming of sharp cusps, etc. During impression making, precautions should be taken to avoid cough or gag reflex to prevent cross-infection. Different methods are used for this, such as proper tray selection, salivary suction, distraction method, mucosal anesthesia etc.² It was found through the survey that 79.1% of dentists were using valid tray selection as a method to avoid cough or gag reflex. Also, dentists should disinfect impressions using various chemicals such as glutaraldehyde, sodium hypochlorite, iodophil, etc. The study shows that the most commonly used chemical for disinfecting impressions is glutaraldehyde (57.6%). Dental practitioners also use various chemicals to disinfect prostheses removed from patients' mouths. Some of these are chlorhexidine, sodium hypochlorite, glutaraldehyde, Povidone-iodine solution etc. Most dentists avoid procedures like border moulding, jaw relation, try-in, and systems requiring radiograph due to the high risk of cross-contamination. Digitalization of dentistry has already decreased cross-contamination during routine practice to some extent. Still, not every dentist is well versed with the techniques of digital procedures, and due to the scarcity of

digital dental laboratories, a very few dentists have upgraded their clinical setup with digital gadgets, such as radio visiograph, digital impression etc.

During dental procedures, especially aerosol-generating procedures, droplets spread towards the dentist's face, particularly towards the eyes and nose, which are essential areas for COVID-19 transmission. Personal Protective Equipment (PPE) can form an effective barrier against the transmission of these contaminated aerosols. This survey found that all the dentists are well aware of the PPEs and use these PPEs, including face masks, N95 masks, eye shields, surgical gowns, surgical gloves, face shields, etc., to the need of the procedure performed. Various face masks and respirators are proven to prevent transmission of COVID-19 effectively. DCI has also mentioned the use of N 95 during routine dental procedures and Filtering Face piece (FFP-3) respirators during treatment of COVID-19 positive patients in its guidelines. The N95 mask has a filtering efficacy of up to 95%, whereas FFP-3 has a filtering capacity of 99%.⁹ It is evident from the study that most dentists are well aware of N95 and FFP-3 and are using these respirators in their clinical practice. A rubber dam provides barrier protection against infectious droplets coming from the patient's oral cavity during aerosol-generating procedures. However, only 28.5% of dentists use rubber dams while treating patients, and this low percentage can be due to the lack of knowledge of the technique of rubber dam application. Dentists should include rubber dam application in their routine practice as it is the most efficient isolation method and protects against infection transmission.² High volume suction devices also help remove droplets from the patient's oral cavity and prevent transmission. 43% of dentists are using high volume suction during procedures. Anti-retraction valves in the dental chairs or anti-retraction hand pieces prevent the aspirate and debris from backflow into the dental unit's water tubes. These are pretty effective in preventing cross-contamination in this pandemic. However, only 31.4% of dental practitioners use anti-retraction handpieces, which might be due to less awareness or the high cost of these hand pieces.

Preprocedural mouth rinse is one of the most effective methods of reducing microorganisms from the oral cavity in routine practice. Most dentists use Preprocedural mouth rinses including chlorhexidine, essential oils,

cetylpyridinium chloride, hydrogen peroxide, Povidone-iodine (PVP-I), etc. 0.12% chlorhexidine, 1.5% hydrogen peroxide and 0.2% Povidone-iodine is safe for use as oral rinses. Some studies have suggested that Povidone-Iodine solution of 0.23% have effectively inactivated SARS-COV and MERS with contact time as low as 15 seconds in vitro. It is safe for use in the oral cavity at a concentration of up to 5%. 0.5% PVP-I can be routinely used in Prosthodontic practice to decrease the risk of viral transmission.¹⁰ SARS-COV-2 can also transmit through indirect contact by touching contaminated surfaces and self-delivery to eyes, nose or mouth. In such a condition, a dental setup can act as a source of cross-contamination. So, it's important to regularly disinfect the dental chair, dental equipment and other surfaces to avoid contamination. Most dentists regularly disinfect surfaces using sodium hypochlorite, ethanol, hydrogen peroxide etc. Ministry of Health and Family Welfare, Government of India, has also given guidelines for disinfecting surfaces using 1% sodium hypochlorite solution.⁸ Removal of contaminated air from the clinical area is as necessary as surface disinfection. The most straightforward and economical method of removing or filtering contaminated air is maintaining air circulation using the ventilated room. It was reported that 61% of dentists use this method in their setup. There are some devices also to remove or filter contaminated air, such as high-volume evacuators and high-efficiency particulate arrestors. Still, these are less common and expensive and used by fewer dentists.² many dentists (90%) follow protocol given by concerning authorities regarding fogging of the clinical setup before closure and are using sodium hypochlorite, hydrogen peroxide, and a mixture of hydrogen peroxide and silver nitrate for fogging. The recommended solution for fogging of the clinic is a 20% working solution of commercially available hydrogen peroxide 11% stabilized by 0.01% of silver nitrate.⁸

During this COVID-19 pandemic, various studies have suggested that hand washing with soap and 70-90% alcohol-based hand rubs effectively curb SARS-CoV-2 transmission.² WHO has indicated that hand hygiene should be performed before touching a patient, before any cleaning or aseptic procedure is performed, after exposure to body fluid, after touching a patient, and after touching a patient's surroundings. Authorities give various guidelines concerning the proper disposal of used PPE kits and the

management of waste generated in a clinical setup.¹¹ And most dental practitioners follow these guidelines and dispose of waste according to them. The study found that 64% of dentists think the above-mentioned preventive measures are sufficient to make the work environment contamination-free and safe.

CONCLUSION

The COVID-19 pandemic has created a highly negative impact on dental professionals. Dentists, by nature, are at high risk of exposure to such infectious diseases, and COVID-19 has brought new challenges to dental professionals. Prosthodontic procedures deal primarily with older adults, who are the most vulnerable population group as far as COVID-19 is concerned. Therefore, a better understanding of COVID-19 transmission and its implications in prosthodontics is essential for making the clinical practice safe for dentists and patients. There are various preventive measures that dentists are using as their routine measures to prevent the transmission of various infectious diseases during their clinical practice. In addition to standard precautions, implementation of particular preventive measures in daily routine could not only avert COVID-19 transmission but also serve as a guide for the prevention of the nosocomial spread of such infectious diseases from a dental clinical setup the coming future. As the dental profession has always adapted and overcome such outbreaks like HIV, SARS, and MERS in the past, incorporating proper preventive measures in daily practice will overcome this COVID-19 pandemic.

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