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RESEARCH ARTICLE

ASSESSMENT OF THE KNOWLEDGE AND AWARENESS ABOUT USE OF PRECAUTIONARY MEASURES DURING COVID 19 PANDEMIC AMONG DENTAL SURGEONS IN INDIA- A CROSS SECTIONAL STUDY

[1,*]Ambuj Shaivy, [2]Lahori Manesh, [3]Karak Soumendu, [4]Kumar Ankur

[1]Post graduate student, Department of Prosthodontics, Crown and bridge and Implantology, K. D Dental College and Hospital, Mathura India
[2]Head of the Department, Department of Prosthodontics Crown and bridge and Implantology, K. D Dental College and Hospital, Mathura India
[3]Post graduate student, Department of Oral and Maxillofacial Surgery; K. D Dental College & Hospital, Mathura India
[4]Tutor cum Statistician, Department of Community Medicine, K. D Medical College, Mathura India

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ABSTRACT

Background: Since December 2019 the rapid spread of the COVID- 19 has induced attention of the government and the public. The motive of this survey was to assess the knowledge and awareness about use of precautionary measures during COVID 19 pandemic among dental surgeons in India. **Method:** This cross sectional web based survey was carried out from 23rd May 2020 to 5th 0f June 2020 comprising of multiple choice questions created by using Google forms. The questionnaire was divided into two sections one containing demographic details and other section containing questions about practice management during this pandemic. Link was shared amongst dentists in India by using various social media platforms and 400 dentists of different specialities took part in the survey. **Result:** Majority of the 400 participants were well informed in infection procedures but many of them were unaware of the alternatives that can be used during this pandemic. For example only 44.8% of dentists were aware of the anti-retraction hand piece and maximum of the dentists were unaware of the fact that centralized AC do not contribute to the spread of infection but its better to use them with HEPA filters. **Conclusion:** The basic knowledge of COVID-19 among the dental surgeons in India is acceptable However, dentists had limited comprehension of the extra precautionary measures that protect the dental staff and other patients from COVID-19.

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INTRODUCTION

The rapid diffusion and spread of the SARS-CoV-2 virus has created a global threat. World Health Organization stated the outbreak to be a Public Health Emergency of International Concern on 30 January 2020 and on 11 March 2020 WHO recognized it as a pandemic (Deblina, 2020). In December 2019, the coronavirus disease (COVID-19) was first reported in Wuhan City, Hubei Province, China. It was caused by the seventh member of enveloped RNA coronavirus, which is currently named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Zhiyan, 2020). Coronaviruses, so named due to the outer fringe of envelope proteins resembling crown ('corona' in Latin), are a family of enveloped RNA viruses (Burrell, 2017). They are generally pathogenic to mammals and birds and cause mild upper respiratory tract infections in humans. They occasionally can be transmitted to a larger human population and can cause severe respiratory illnesses exemplified by Severe Acute Respiratory Syndrome (SARS) and Middle-East Respiratory Syndrome (MERS) in 2003 and 2012 respectively (Deblina, 2020). MERS-CoV and SARS-CoV have a higher mortality rate of 11% and 34.4% respectively, compared to 4.4% of SARS-CoV-2 (Baharoon, 2019) but the highly contagious nature of this virus has created a dreadful situation all over the world. Similarities were observed in the sequence homology of viral nucleic acids isolated from COVID-19 patients with a sequence of CoV isolated from bats, snakes, and pangolins (Zhou, 2020).

Corresponding author: **Ambuj Shaivy**
Post graduate student, Department of Prosthodontics, crown & bridge and Implantology, K. D Dental College & Hospital, Mathura India.

Dental health care workers (DHCW's) are invariably at a higher risk of contracting this infectious disease; and oral health care settings may act as a means of disease transfer (Peng, 2020) . Another published report also suggests that the patients visiting dental settings for their routine or other emergency treatments and the DHCW's can serve as a reservoir for the microorganisms that cause various infectious diseases, including COVID-19 (Volgenant, 2018). Till july 26th 2020 there have been more than 13 lakh confirmed cases reported in India. WHO and IDA have provided various guidelines for practice management during COVID 19 pandemic. This cross sectional study aims at investigating the knowledge and awareness about various precautionary measures that should be followed during this pandemic to minimize the spread of the infection among dental professionals of India. A well-informed dental health care professional on COVID-19 may not only be a prominent source to promulgate correct knowledge in the community but also to create a safe haven for the work colleagues and patients (Mir, 2020).

METHODS

Study design: The survey featured multiple choice questions that were intended to assess the awareness and knowledge about implementation of changes in the practice management to prevent the spread of infection during COVID 19 pandemic. It consisted of two sections with the first section comprising demographic details like name, age, email-id and speciality and the second section comprising of 28 multiple choice questions.

Data collection: The study population consisted of dentists of different specialities who work in India regardless of their place of work either in private clinics, hospitals, or health centers. This survey was conducted in last week of May 2020 and continued to first week of June 2020. An online questionnaire using Google forms was used to collect the data. The link of the questionnaire was sent through emails, WhatsApp and other social media to the contacts of the investigators. The participants were encouraged to roll out the survey to as many fellow dentists as possible. The data was collected from 23rd May 2020 to 5th June 2020. 400 dentists of different specialities took part in the survey. If the questionnaire had complete answers it was regarded as valid.

Data analysis: Data entry and analysis was performed using IBM SPSS v. 25 and percentages obtained from different options in the question were used to describe the categorical data.

RESULTS

This survey of awareness and knowledge about precautionary measures during COVID 19 among dental surgeons of different speciality was accessible online from 23rd May to 5th June 2020 and included total 400 dental surgeons aged from 21 to 51 year. Among 72 % of the participants preferred AC equipped with HEPA filters and 26 % were not aware about the HEPA filters. Maximum of participants i.e 93.3% agreed for alcohol based hand rub for every person entering the clinic and and 6.5 % favored for staff and the dentist only.

Regarding mask, majority (90.5%) preferred N95 or FFP masks and 9.5% preferred surgical mask only. About donning and doffing of PPE 55.6% of the total participants were correct about the donning sequence and 67.4% were correct about the doffing sequence rest were incorrect. Majority of the participants 83% to be precise were correct about the emergency and urgent conditions. In case of aerosol producing agents 65% of participants said that air water syringe, airrotor and ultrasonic scalers all produces highest amount of aerosols and only 21% were correct about the sonic and ultrasonic scalers. 85% were correct about the contents of the aerosols 5.3% said viruses, 2% bacteria and 4.8 % agreed for contaminated blood particles only 3% were unaware. Regarding isolation method during procedures 94% preferred using rubber dam and 6% preferred cotton roles.89% of the total participants were aware about using high volume evacuation suction tips and 11% preferred normal suction tips. Regarding preference for using hand piece 44.8 % were in favor of using anti-retraction handpiece 33% favored electric motor hand piece and 22% preferred using air-rotor hand piece. Among surface disinfectants 62.5% of the participants preferred using sodium hypochlorite while 36.2 % preferred using 70% alcohol based surface disinfectant.

DISCUSSION

The first case of COVID 19 in India, which originated from China was first reported on 30 January 2020. India currently has the highest number of confirmed cases in Asia and has the third highest number of confirmed cases in the world after the United States and Brazil. Although India's fatality rate is among the lowest in the world at 2.41% and the recovery rate is also very good as of 23rd July 2020 (9. en.wikipedia.org/wiki/ COVID-19 pandemic in India. July 2020.). On account of the rapid spread and the increase of death associated with COVID 19 in India, it became the focus of public concern in understanding how to carry out precautionary measures both at the individual and community levels. The goal of the current study was to investigate the knowledge and comprehension about COVID 19 among dental professionals.

The results of the survey showed that almost all the dentists 99.5% to be precise agreed for placing visual alerts inside and outside of the clinic containing information about hand hygiene and cough etiquettes as many people in India do not have access to internet and placing visual alerts both outside and inside the clinic will help in spreading awareness for the people passing by the clinic and also the people visiting the clinic. As this pandemic has altered our lifestyle at a faster rate so modifying sitting arrangement in the waiting area to follow social distancing or more aptly called physical distancing is a necessity so 99.5% of the clinicians agreed for this. CDC has defined social distancing as " remaining out of congregate settings, avoiding mass gatherings and maintaining distance (approximately six feet or two meters) from others when possible (Centers for Disease Control and Prevention. Coronavirus Disease, 2019). So the sitting arrangement should be modified to follow the norms of physical distancing. Sterilization of instruments have been mandatorily practiced in dental clinics. But air purification and aerosol management has not been routinely practiced. Dental clinics should not rely on a single precautionary strategy.

Table 1. Assessment of the knowledge and awareness about modification in the clinic setup

S no	Variable	Frequency	Yes (in percentage	No (in percentage)	Not aware (in percentage)
1	Do you think placing visual alerts(posters and pamphlets inside and outside the clinic) for patient awareness about Covid 19 pandemic , cough etiquette and hand hygiene practice is necessary?	400	99.5	0.5	-
2	Do you think modifying the sitting arrangement to practice social distancing in your patients waiting area is required during this time period?	400	99.5	0.5	-
3	Do you think proper air ventilation of the clinic is necessary ?	400	90.5	3	6.5
4	Do you think centralized air conditioning in your clinic can contribute to infection	400	73	13.8	13.3

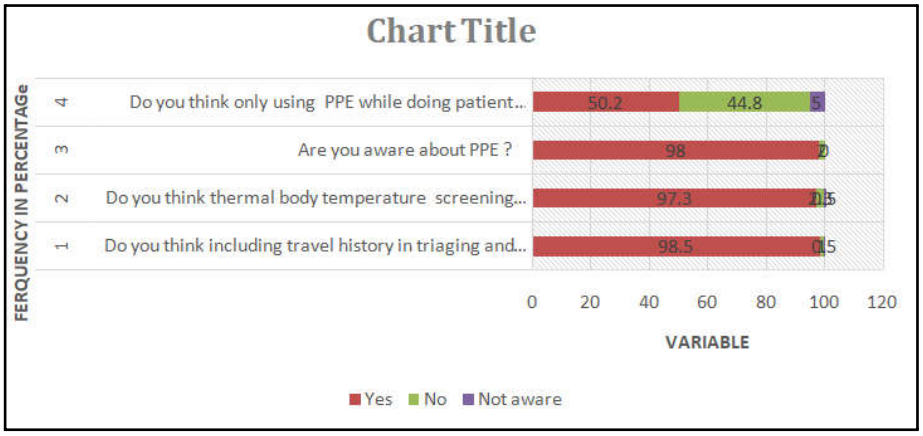

Figure 1 ;Assessment of the knowledge and awareness about modification in the clinic setup

S no	Variable	Frequency	Yes (in percentage)	No (in percentage)	Not aware (in percentage)
1	Do you think including travel history in triaging and prescreening in your OPD is important?	400	98.5	1	0.5
2	Do you think thermal body temperature screening of every patient entering the clinic should be done?	400	97.3	2.3	0.5
3	Are you aware about PPE ?	400	98	2	-
4	Do you think only using PPE while doing patient will protect you from this virus?	400	50.2	44.8	5
5	Do you think direct walk ins in the dental clinics should be discouraged other than emergency and urgent dental conditions?	400	90.5	6	3.5
6	Will you prefer pre-procedural mouth rinse for every patient?	400	99.3	0.8	-
7	Do you know aerosol production during dental procedures can contribute to the spread?	400	98.5	1.5	-
8	Is it necessary to isolate and treat the patients with droplet spreading diseases separately in your dental clinic?	400	94	1.8	4.3
9	Do you think flushing all the incoming waterlines from the public water system and inside the dental office and dental chair pipelines before and after the patient for 1 to 5 mins is necessary?	400	76.8	1.5	21.8
10	Do you think universal surface disinfectant protocol should be followed before and after attending patient?	400	97.5	0.3	2.3

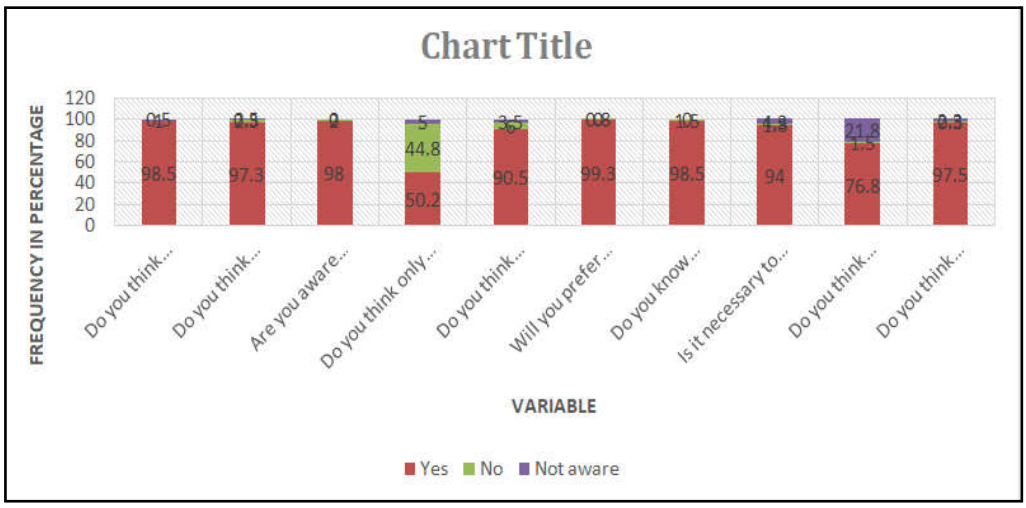

Figure 2. Assessment of practice management for preventing infection control during COVID 19 pandemic

A single step will reduce the risk of infection by a certain percentage. The simplest way is using natural ventilators and this survey showed that 90.5% of the participants favored proper air ventilation of the clinic to move the air from inside of the room to outside. This survey showed that about 73% of the dentists believe that centralized AC can contribute to the infection this shows that many of the participants have less acquaintance of centralized AC system, these central air conditioning systems use commercial air filters to circulate cold air. By design these filters can remove coarse particles, but its better if they are equipped with HEPA (High Efficiency Particulate Air) filters. HEPA air filters are made from very tiny glass fibers that are made into a tightly woven paper. The filter consist of numerous small sieves that can capture extremely small particles including some biological agents (Abhay, 2020). They can remove atleast 99.97% of aerosols or any airborne particles and this survey showed the inclination of participants towards using HEPA filters 73% to be precise but 26% of the participants were unaware of HEPA filters. Since the first infected case was reported in China, so it is of utmost importance to include travel history in OPD to check whether the patient has travelled from any infected region in the last 14 days and 98.5% of the participants were in favor of this. Since majority of the patients experience fever due to this infection so body temperature screening should be done at the reception only and majority of the dentists approved of this.

Infection control is additive, so adding extra protocols will reduce the potential risks like asking every person entering the clinic to perform hand hygiene by alcohol based hand rub and asking everyone to wear mask and majority of the dental professionals agreed for this and only very few of the practitioners favored this to be followed by only dentist and staff, and also regarding the type of mask maximum of the dentists preferred using N95/FFP masks or respirators instead of surgical mask as N95 respirators filters particles from reaching the respiratory system and surgical mask only protects the mucous membrane of the wearer from contact with patient body fluids . The use of PPE, including protective eyewear, masks, gloves, caps, face shields, and protective outerwear, is strongly recommended for all healthcare givers in the clinic/hospital settings during the COVID-19 pandemic, so knowledge of proper donning and doffing sequence is the most pressing need but this survey showed that only half of the clinicians are aware of the correct sequence and half of them were either wrong or were unaware.

To minimise the risk of exposure and community spread it is critical to reduce physical walk-ins in the dental setting. This can be done effectively by tele-screening and triaging by phone (Wheeler et al., 2015). Only patients which fall under Emergency/Urgent Care should be attended to or scheduled immediately for management. While others may be tele-counselled, put under pharmacological management if needed and kept on a telephonic follow up for any exacerbation of symptoms (Krithikadatta, 2020). Concentration on emergency care will take care of immediate patient needs for true dental emergencies and to follow this direct walk ins in the clinic should be greatly discouraged. This survey showed that maximum of the dentist were aware of the emergency dental conditions and disapproved direct walk ins. To reduce the the salivary load of oral microbes pre procedural mouth rinse is a prerequisite and Chlorhexidine is proved to be ineffective against SARS-CoV-2 (Eggers, 2018; Kariwa, 2004) but only 39% of the dental professionals preferred 1% H2O2 or 0.2% povidone iodine which is highly effective against this virus maximum of them preferred chlorhexidine mouth rinse this may be due to lack of information or awareness. Aerosol transmission is one of the common source of novel coronavirus other than direct and contact transmission so it is necessary to isolate and treat the patients with droplet spreading diseases separately in the dental clinic and maximum of the clinicians were found to be aware of this fact as aerosol contains viruses bacteria nasopharyngeal secretions and contaminated blood particles .Sonic and ultrasonic scalers produce highest amount of aerosols and this procedure is generally followed before any dental procedure but maximum(65.5%) of the practitioners were unaware of that, as other than sonic and ultrasonic scalers airrotor and air water syringe also produce aerosols. So minimizing the techniques and products that produce aerosols would be a good option and also using a good isolation method including rubber dams and high volume evacuation suction tips will add up to this and maximum of the practitioners recommended this over cotton rolls and normal suction tips in this survey.

Other than isolation method, use of a good quality hand piece will also contribute in source control. Electric motor hand piece is one such option but as it generates heat so it can cause damage to pulp so anti-retraction hand piece has recently been introduced to reduce the aerosol production, these have anti retractive valves or other antireflux designs to prevent cross infection but according to our survey only 44.8% of the practioners recommended antiretraction hand piece and 33.3% recommended electric motor hand piece this may be because of high cost of the antiretraction handpiece or may be many of them are unaware of this new product. The water spray used with a modern high-speed dental drill is a significant vehicle for dispersion of infectious agents into the environment, putting patients and the dental staff at risk of infection. Waterlines for the air-water syringe and handpiece can become contaminated with bacteria. Infectious agents also can be introduced into the handpiece water supply from a previous patient or the current patient. Infectious agents can be aspirated into the waterline from the patient's mouth when the water is shut off, even when the handpiece is equipped with anti-retraction valves (Robert, 1995) so all incoming waterlines from the public water system into the dental office and the dental chair pipelines should be flushed for 1 to 5 minutes before the dental procedure but 21.8% of the practitioners were found to be unaware of this and only 76.8% of the practitioners supported this.

Although disinfection is a routine practice in dentistry, with the prevailing pandemic it has gained immense importance as COVID 19 virus have been found to be persistent on different surfaces so universal surface disinfection protocol should be followed before and after doing any procedure on patients and 97.7% of the clinicians recommended this and many of the disinfectants which are effective against this virus is available in the market including ethanol, sodium hypochlorite, chlorine base products and 62.5% of the dentists recommended sodium hypochlorite and 36.2% of the dentists preferred alcohol based surface disinfectant.

Conclusion

In conclusion, the basic knowledge on COVID-19 among dental surgeons in India is acceptable. Timely dissemination of information by the Ministry of Health, India had a positive impact on the COVID-19 knowledge score of the dental surgeons. However, dentists had limited comprehension of the extra precautionary measures that protect the dental staff and other patients from COVID-19. Guidelines released by reputable institutions should be sent by the regional and national dental associations to all registered dentists during crisis, including this COVID -19 pandemic, to make sure that dentist are well informed and aware of the best practices and recommended disease management approaches

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Conflict of interest: We have no conflict of interest.

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