



Assessment of Knowledge, Attitude, Practice among Dental Practitioners during Covid-19 Crisis in South Indian Population - A Questionnaire Based Survey

Jerry Jose, Deepak S*, Surendar Sugumaran

Department of Conservative Dentistry and Endodontics, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India



Article History:

Received on: 16 Nov 2020

Revised on: 16 Dec 2020

Accepted on: 18 Dec 2020

Keywords:

Coronavirus,
Dental practitioners,
Dental Practice,
KAP Survey

ABSTRACT

The coronavirus disease (COVID-19) has thrown the world into a great deal of health care crisis, with over 2 million people affected globally and more than 1,50,000 deaths. Testing is crucial to gauge the extent of transmission with the currently having the lowest ratio of testing in the world. It is of crucial importance that healthcare workers specially dental practitioners should have adequate knowledge, attitude and practice protocol to prevent any transmission to take place. A Questionnaire-based survey was done among 200 dental practitioners in the South Indian region in which 133 dental practitioners responded. The survey was distributed through electronic media (Google forms). The survey data was collected, analyzed and interpreted. The results suggested that about 80% of Dental practitioners have adequate knowledge and attitude towards the different protocols to be followed during the COVID-19 crisis in their dental practice. Still, there was a lack of recommended practice protocol by these practitioners during the pandemic crisis in the South Indian population. The survey shows that dental practitioners have a sound knowledge, attitude, but the practical application during the pandemic crisis was seen to be varied among various dental practitioners.

*Corresponding Author

Name: Deepak S

Phone:

Email: deepaks.sdc@saveetha.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL1.3714>

Production and Hosted by

IJRPS | www.ijrps.com

© 2020 | All rights reserved.

INTRODUCTION

The COVID-19 crisis is the current outbreak crisis of viral origin originally originated in the city of Wuhan, China (Hubei province of China) (Zhu *et al.*, 2019). The current scenario as of May 2020 has shown to spread around 213 countries and Terri-

tories. The coronavirus (CoVs) are named due to the presence of crown-like spiked proteins on their surface. They are positive-sense RNA based viruses with four different groups predominantly present, namely alpha, beta, gamma and delta (Fehr and Perlman, 2015).

Currently, there are seven strains of coronavirus seen to affect human, 229E (alpha coronavirus), NL (alphavirus), OC43 (beta coronavirus), HKU1 (beta coronavirus), MERS-CoV (Middle East respiratory syndrome or MERS), SARS-CoV (the beta coronavirus causes severe acute respiratory syndrome or SARS) and the current SARS-CoV-2 (COVID-19) (Shereen *et al.*, 2020).

Due to the virulence of current pathogen SARS-CoV-2 which was shown to have human to human transmission through respiratory droplets (Sohrabi *et al.*, 2020), it is reported that dental professionals are at high risk of nosocomial infection and could be a

potential carrier of the disease (Wax and Christian, 2020). Many factors contribute to these factors such as aerosol generation, handling of sharps and proximity of the dental care providers to the patients oropharyngeal region (Peng *et al.*, 2020). It is of primordial importance that all dental practitioners should follow correct protocol to prevent any further transmission for the safety of the health care professional and the patient.

Since a variety of procedures are carried out by dental practitioners such as treatment of tooth fractures (Jose *et al.*, 2020), endodontic treatment (Ramamoorthi *et al.*, 2015), veneers (Ravinthar and Jayalakshmi, 2018) correct protocol should be followed to prevent any cross-contamination. Various studies have shown the effect of different intracanal irrigants (Noor and Pradeep, 2016; Manohar and Sharma, 2018; Teja *et al.*, 2018) that can have an effect on reduction on viral load if treatment is done in covid positive patients.

For the diagnosis the use of different diagnostic factors can play a crucial role than the conventional pulp vitality testing method, innovative methods such as custom made sensors can play a better alternative for the diagnostic procedure (Janani *et al.*, 2020). The use of CBCT in this pandemic is an alternative since it reduces the incidence of exposure for the operator without the patient coming directly in contact. (Ramanathan and Solete, 2015).

CBCT can help assess different morphology which helps the clinician to assess better and formulate a treatment plan (Kumar and Antony, 2018). During the pandemic period, the use of better higher strength restorative material can play a crucial factor for the success of the treatment (Nasim and Nandakumar, 2018; Nasim *et al.*, 2018; Rajakeerthi and Nivedhitha, 2019). This survey aims to assess the knowledge, attitude, the practice of dental practitioners and the different protocols to be followed during COVID-19 pandemic crisis in the South Indian population.

MATERIALS AND METHODS

A self-administered questionnaire in English format comprising a total of 10 questions was distributed to the dental population residing in the South Indian region via Electronic media (Google forms, Google Inc, USA).

The questionnaire consisted of 3 significant parts aimed to assess different aspects of the clinician being four questions to assess the knowledge, 3 to assess attitude and the remaining questions to

assess the practice protocol. The sample size was taken using a sample size calculator with the confidence interval set at 95%. Convenience sampling was to be taken into considerations.

RESULTS AND DISCUSSION

The results consisted primarily of dental practitioners with a masters degree (MDS) which comprised 76.7% of MDS in various fields and 19.5% of MDS in Conservative Dentistry and Endodontics 3.8% of the Dental practitioners were practitioners who had a graduate degree (BDS).

Table 1 Statistical analysis was done using Chi square test for intercomparison between the different dental practitioners who responded for the survey and p value <0.005 was found to be statistically significant.

Figure 1, Majority of the respondents were from MDS — Other speciality (76.69%), MDS — Endodontics (19.55%) and BDS (3.76%).

Figure 2, Majority of the respondents selected the option “1% hydrogen peroxide” (87.2%), next majority responses selected the option “0.2% Povidone Iodine” (8.27%) and remaining selected the option “2% Chlorehexidine” (4.51%).

Figure 3, Majority of the respondents selected the option “Tooth preparation with aerotors” (83.46%), other majority selecting the option “Radiographs” (11.28%), remaining respondents selecting the option “Ultrasonics scaler” (5.26%).

Figure 4, Majority of the respondents selected the option “Dry cough” (83.46%), others selecting the options “Dysgeusia” (8.27%), “None of the above” (4.52%), “Hyposmia” (2.26%) and “Myalgia” (1.50%).

Figure 5, Majority of the respondents selected the option “Gender - Female” (93.23%), “Age — 50 and above” (4.51%), “Cardiovascular disease” (0.75%) and “Immunosuppression” (1.5%).

Figure 6, Majority of the respondents selected the option “Aerosol” (87.22%), “All of the above” (12.78%). “Fomites” and “Fecal-Oral route) were not selected as options by any of the respondents.

Figure 7, Majority of the respondents responded selected the option “Till three days” (52.63%), other selecting the options “5 days” (37.59%) and “3-5 days” (9.77%).

Figure 8, Majority of the respondents selected the option “Gown-Mask-Goggles/FaceShield-Gloves” (56.39%), and others selecting the option “Gown-Goggles-Gloves-Mask” (36.09%), “Mask-Goggles/Face Shield-Gloves-Gown” (7.52%).

Table 1: Percentage of responses for each question and statistical analysis

| | | Profession | | | Chi Square Value | P value |
|---|--------------------------------------|-----------------|----------------------|--------|------------------|---------|
| | | MDS Endodontics | MDS Other Speciality | Bds | | |
| Which of the following outhiness is shown to be most useful to COVID-19 pathogen? | 0.2% povidone-iodine | 3.8% | 9.8% | 0.0% | 16.363 | 0.003* |
| | 1% hydrogen peroxide | 92.3% | 87.3% | 60.0% | | |
| Which dental procedure should be most avoided during the COVID-19 pandemic? | 2% Chlorhexidine | 3.8% | 2.9% | 40.0% | 44.400 | 0.000* |
| | Radiographs | 15.4% | 5.9% | 100.0% | | |
| | Tooth preparation with aerotors | 84.6% | 87.3% | 0.0% | | |
| Which is the most commonly seen symptom for suspected COVID-19 patients? | Use of 3-way airway syringe | 0.0% | 6.9% | 0.0% | 40.205 | 0.000* |
| | Dry cough | 84.6% | 87.3% | 0.0% | | |
| | Dysgeusia | 3.8% | 7.8% | 40.0% | | |
| | Hyposmia | 0.0% | 2.0% | 20.0% | | |
| Which of the following is the highest risk factor for COVID-19 infection? | None of the above | 3.8% | 0.0% | 0.0% | 18.009 | 0.006* |
| | Myalgia | 0.0% | 1.0% | 20.0% | | |
| | Age - 50 and above | 0.0% | 5.9% | 0.0% | | |
| | Cardiovascular disease | 3.8% | 0.0% | 0.0% | | |
| Which is the most common route of spread of COVID-19 infection? | Gender - Female | 96.2% | 93.1% | 80.0% | 21.234 | 0.000* |
| | Immunosuppression | 0.0% | 1.0% | 20.0% | | |
| What is the viability period of SARS CoV-2 in the form of aerosol? | Aerosol | 92.3% | 89.2% | 20.0% | 38.280 | 0.000* |
| | All of the above | 7.7% | 10.8% | 80.0% | | |
| What is the proper sequence of wearing a PPE? | 3-5 days | 7.7% | 7.8% | 60.0% | 53.632 | 0.000* |
| | 5 day | 0.0% | 49.0% | 0.0% | | |
| | Till three days | 92.3% | 43.1% | 40.0% | | |
| How often do you use PPE in your dental practice? | Gown-Goggles-Gloves-Mask | 0.0% | 47.1% | 0.0% | 15.691 | 0.003* |
| | Gown-Mask-Goggles/Face Shield-Gloves | 100.0% | 42.2% | 20.0% | | |
| | Mask-Goggles/Face Shield-Gloves-Gown | 0.0% | 6.9% | 60.0% | | |
| | Mask-Goggles/Face Shield-Gown-Gloves | 0.0% | 3.9% | 20.0% | | |
| Do you use pre-procedural mouth rinse in your dental practice? | Always | 0.0% | 31.4% | 60.0% | 8.634 | 0.071 |
| | Never | 11.5% | 5.9% | 20.0% | | |
| | Sometimes | 88.5% | 62.7% | 20.0% | | |
| | Yes | 84.6% | 91.2% | 80.0% | | |
| | No | 7.7% | 1.0% | 20.0% | | |
| | Sometimes | 7.7% | 7.8% | 0.0% | | |

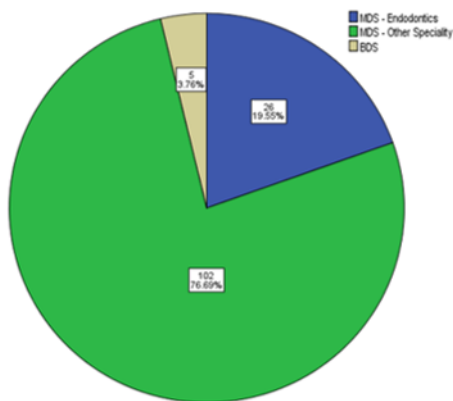


Figure 1: Pie chart denotes the distribution of educational qualification

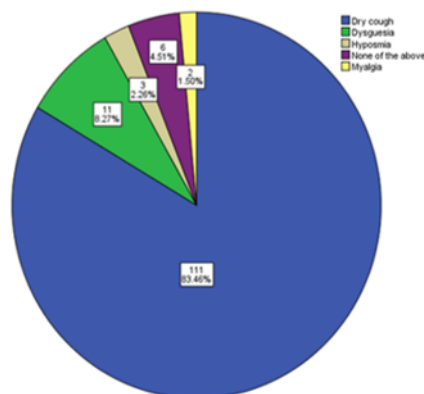


Figure 4: Pie chart denotes the frequency of distribution of response to the question "Which is most commonly seen symptom for suspected COVID-19 patient?"

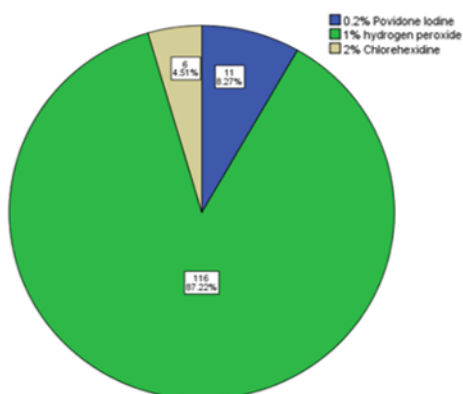


Figure 2: Pie chart denotes the distribution of response to the question "Which of the following mouthrinses is shown to be most effective to COVID-19 pathogen?"

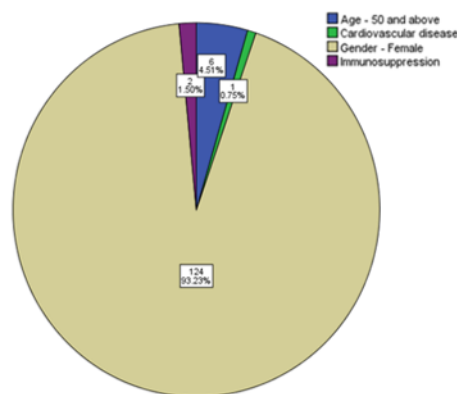


Figure 5: Pie chart denotes the frequency of distribution of response to the question "Which of the following is the highest risk factor for COVID-19 infection?"

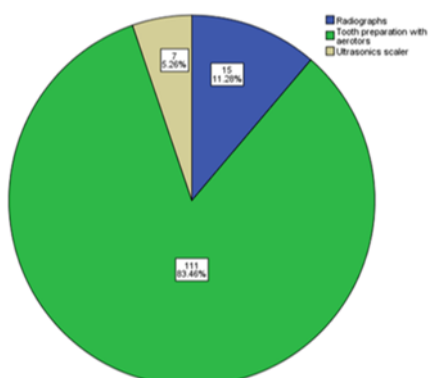


Figure 3: Pie chart denotes the distribution of response to the question "Which dental procedure should be most avoided during the COVID-19 pandemic?"

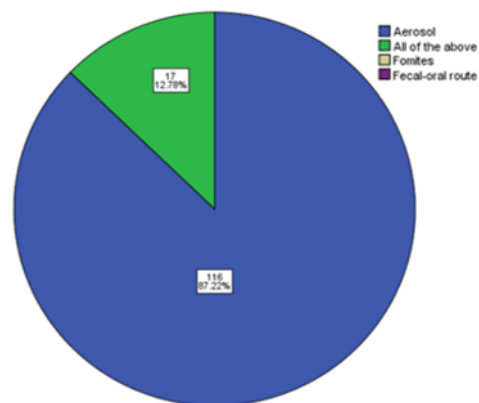


Figure 6: Pie chart denotes the frequency of distribution of response to the question "Which is the most common route of spread of COVID-19 infection?"

Figure 9, Majority of the respondents selecting the option "Sometimes" (66.17%), next majority selecting the option "Always" (26.32%) and others selecting the option "Never — Use only mask and gloves" (7.52%).

Figure 10, Majority of the respondents selected the

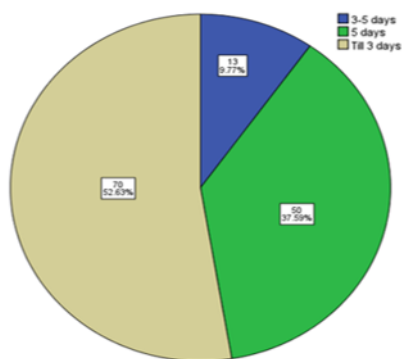


Figure 7: Pie chart denotes the frequency of distribution of response to the question “What is the viability period of SARS CoV-2 in the form of aerosol?”

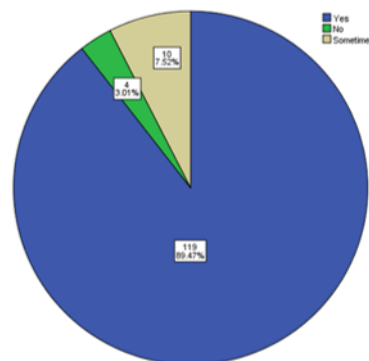


Figure 10: Pie chart denotes the frequency of distribution of response to the question “Do you use pre procedural mouthrinse in your dental practice?”

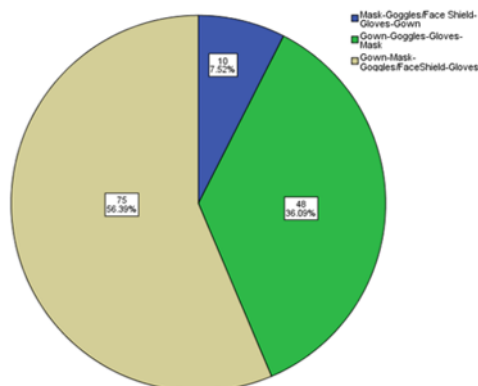


Figure 8: Pie chart denotes the frequency of distribution of response to the question “What is the proper sequence of wearing a PPE?”

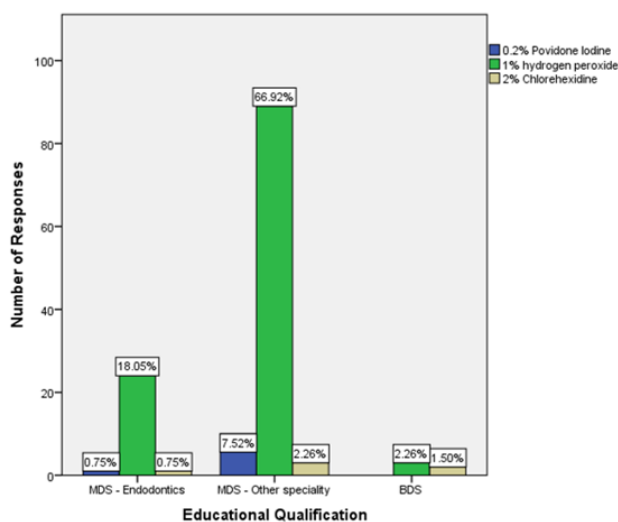


Figure 11: Bar chart showing the association between the field of practice of participants and responses to the question “Which of the following mouthrinses is shown to be most effective to COVID-19 pathogen?”

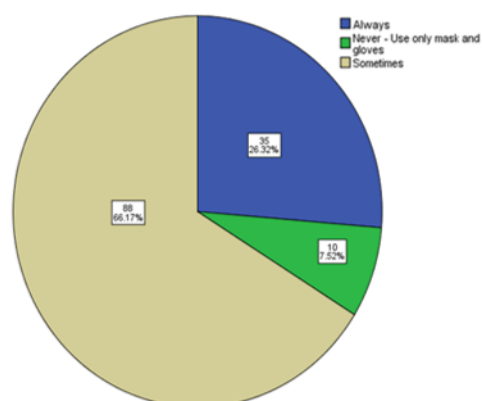


Figure 9: Pie chart denotes the frequency of distribution of response to the question “How often do you use PPE in your regular dental practice?”

option “Yes” (89.47%), the next majority selecting the option “Sometimes” (7.52%), and others selecting the option “No” (3%).

Figure 11, The X-axis represents the educational qualification and Y-axis represents the number of respondents who answered 0.2% Povidone-iodine (blue), 1 % hydrogen peroxide (green) and 2% Chlorhexidine (beige). According to the responses seen, MDS endodontists and other speciality MDS specialists preferred 1% hydrogen peroxide as the preferred mouth rinse, which is shown to be effective against COVID-19 pathogen and this difference is statistically significant. (Chi-square test, Pearson’s Chi-square value: 16.363, p value: 0.003 (p<0.05 which is statistically significant)).

Figure 12, The X-axis represents the field of practice. The Y-axis represents the number of respondents

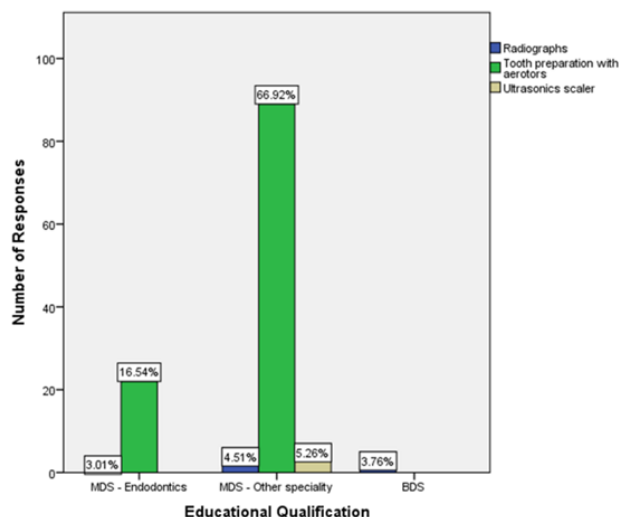


Figure 12: Bar chart showing the association between the field of practice of participants and responses to the question “Which dental procedure should be most avoided during the COVID-19 pandemic?”

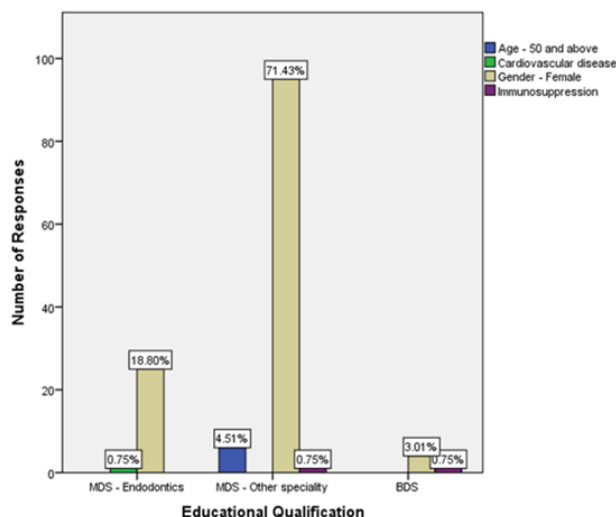


Figure 14: Bar chart showing the association between the field of practice of participants and responses to the question “Which of the following is the highest risk factor for COVID-19 infection?”

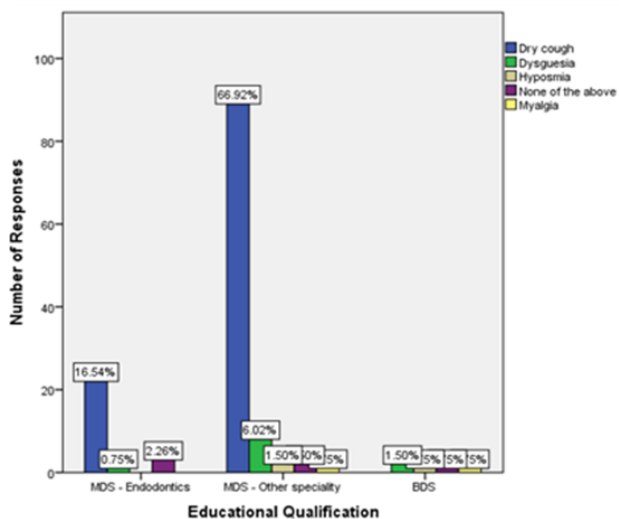


Figure 13: Bar chart showing the association between the field of practice of participants and responses to the question “Which is most commonly seen symptom for suspected COVID-19 patient?”

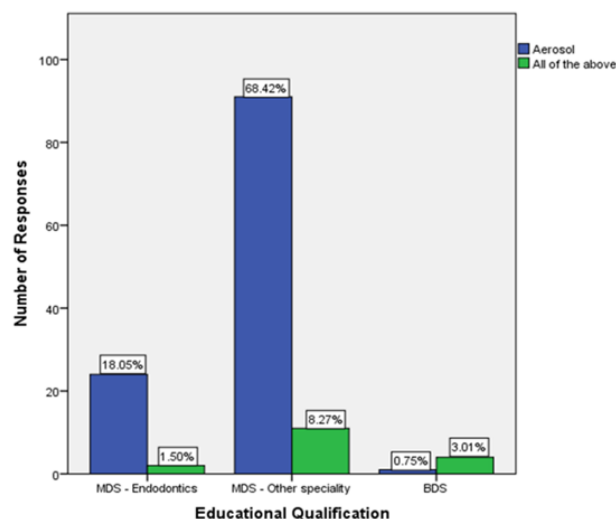


Figure 15: Bar chart showing the association between the field of practice of participants and responses to the question “Which is the most common route of spread of COVID-19 infection?”

who answered Radiographs (blue), Tooth preparation with aerators (green) and Ultrasonic scaler (beige). According to the responses seen, tooth preparation with aerators was seen to be the most avoided dental procedure among MDS endodontists and other speciality MDS specialists during the COVID-19 pandemic. (Chi-square test, Pearson’s Chi-square value: 44.400, p value: 0.000 ($p < 0.05$ which is statistically significant)).

Figure 13, The X-axis represents the field of practice. The Y-axis represents the number of respon-

dents who answered Dry cough (blue), Dysgeusia (green), Hyposmia (beige), None of the above (red) and Myalgia (yellow). According to the responses seen, dry cough is the most commonly presented symptom for suspected COVID-19 patients according to MDS endodontists and other speciality MDS specialists. (Chi-square test, Pearson’s Chi-square value: 40.205, p value: 0.000 ($p < 0.05$ which is statistically significant)).

Figure 14, The X-axis represents the field of practice. The Y-axis represents the number of respondents

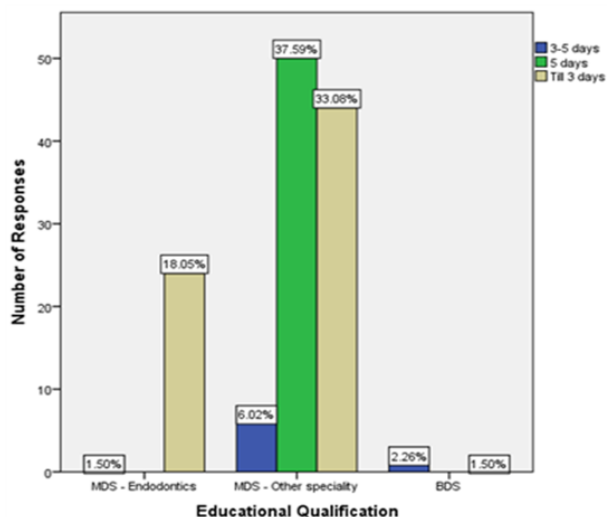


Figure 16: Bar chart showing the association between the field of practice of participants and responses to the question “What is the viability period of SARS CoV-2 in the form of aerosol?”

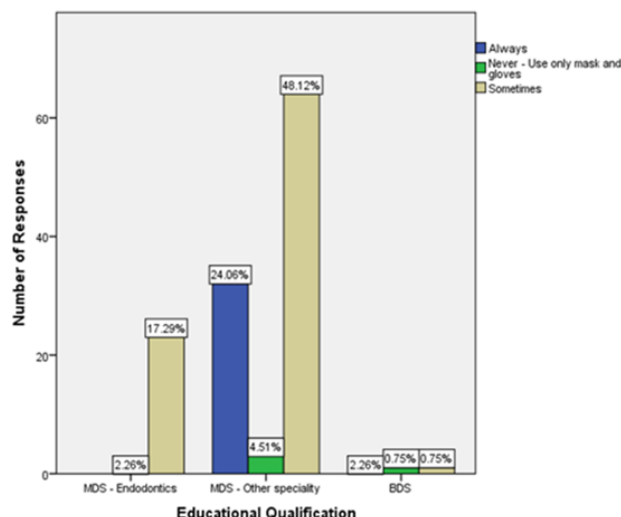


Figure 18: Bar chart showing the association between the field of practice of participants and responses to the question “How often do you use PPE in your regular dental practice?”

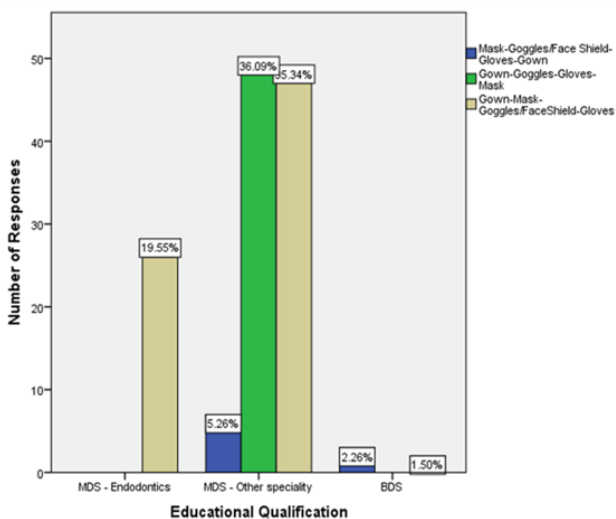


Figure 17: Bar chart showing the association between the field of practice of participants and responses to the question “What is the proper sequence of wearing a PPE?” and the Y-axis represents the number of responses

who answered Age -50 and above (blue), Cardiovascular disease (green), Gender - Female (beige) and Immunosuppression (red). According to the responses seen, MDS endodontists and other speciality MDS specialists assumed Gender-Female is the highest risk factor for COVID-19 infection. (Chi-square test, Pearson’s Chi-square value: 18.009, p value: 0.006 (p<0.05 which is statistically significant)).

Figure 15, The X-axis represents the field of practice. The Y-axis represents the number of respondents who answered Aerosol (blue) and All of the

above (green). According to the responses seen, aerosols is thought to be the most common route of spread of COVID-19 infection in dental practice by MDS endodontists and other speciality MDS specialists. (Chi-square test, Pearson’s Chi-square value: 21.234, p value: 0.000 (p<0.05 which is statistically significant)).

Figure 16, The X-axis represents the field of practice, the Y-axis represents the number of respondents who answered 3-5 days (blue), five days (green) and till three days (beige). The responses varied according to the speciality, according to majority of MDS Endodontists thought viability period of SARS CoV-2 in the form of aerosol was till three days while majority other specialist MDS specialists responded the viability period of SARS CoV-2 in the form of aerosol to be for five days. (Chi-square test, Pearson’s Chi-square value: 38.280, p value: 0.000 (p<0.05 which is statistically significant)).

Figure 17, The X-axis represents the field of practice. The Y-axis represents the number of respondents who answered Mask-goggles/face shield-gloves-gown (blue), Gown-Goggles-Gloves-Mask (green) and Gown-Mask-Goggles/FaceShield-Gloves (beige). According to the responses, very few dentists knew the proper sequence of wearing PPE (Mask-goggles/face shield-gloves-gown), while many MDS endodontists and other speciality MDS specialists assumed the correct sequence to be Gown-mask-goggles/face shield-gloves. (Chi-square test, Pearson’s Chi-square value: 53.632, p value: 0.000 (p<0.05 which is statistically significant)).

Figure 18, The X-axis represents the field of practice, the Y-axis represents the number of respondents who Always answered (blue), Never - Use only mask and gloves (green) and Sometimes (beige). According to the responses seen, PPE is used only sometimes by MDS endodontists and other speciality MDS specialists in regular dental practice. (Chi-square test, Pearson's Chi-square value: 15.691, p value: 0.000 (p<0.05 which is statistically significant)).

China (Wuhan Province) in December 2019 showed a B-coronavirus in which they found a cluster of pneumonia cases. This coronavirus was of similar origin to previously reported SARS-CoV-1 and had a different mode of pathogenicity compared to it (Van Doremalen, 2020) with WHO officially naming the disease as coronavirus disease (COVID-19) and International committee of a coronavirus study group giving a name of SARS-COV-2 (Jiang et al., 2020; Gorbalenya et al., 2020) both in February 2020. In the present study, most of the practitioners (40.6%) had given a correct response of naming of the pathogen according to WHO and (24.8%) had reported it as SARS- CoV- 2.

SARS-CoV-2, reportedly a mutation of the previous generation and is the 7th known coronavirus to affect humans. The genome of SARS- CoV-2 is reportedly unclear with the most possible way of transmission accepted at the moment being a natural selection from animal host via zoonotic transfer specially bats (Andersen et al., 2020) and 44.4% to COV-1 and 21.1% to MERS CoV-1. Though the theory is not yet proven, it is shown to be most accepted being a zoonotic spread and not a mutational change of the previously reported SARS-CoV-1 (Zhang et al., 2020; Li, 2005).

The reproductive number is an indicator of the contagiousness or transmissibility of infectious disease and plays a crucial factor of the spread of infection. WHO estimates the reproduction number to be around 1.4 to 2.5 (Cheng and Khan, 2020) but was contradicted by a recent report by (Liu et al., 2020) saying the reported reproduction number being 2.6-4.7 which is more than SARS-CoV-1. The knowledge assessment in our study showed 24.8% had given a correct response within the reported range and 67.7% majority reporting to be more than 2.6-4.6% which was an acceptable range.

Patients with COVID-19 usually present with symptoms such as fever, dry cough and myalgia and other symptoms being nausea, diarrhoea, reduced sense of smell (hyposmia) and dysgeusia (Zheng et al., 2020; Paramasivam et al., 2020). During a dental practice it is always advised to do a preprocedu-

ral rinse which helps to reduce the viral/bacterial load (Jesudasan et al., 2015; Ramesh et al., 2016; Selvakumar and Np, 2017; Prabakar et al., 2018; Mohapatra et al., 2019).

Previous reports have shown that SARS-CoV and MERS-CoV were highly effective the usage of povidone mouth rinse and is suggested to be used currently with no reports proving the efficacy against the current strain of pathogen (Rajendran et al., 2019; Ather et al., 2020). It was seen that 0.2% of Povidone Iodine might reduce the coronavirus load in saliva (Eggers et al., 2018; Rajendran et al., 2019). Another alternative is 0.5-1% hydrogen peroxide mouth rinse showing nonspecific virucidal activity against all strains of previously reported coronavirus (Kampf et al., 2020). The current study of ours showed 87.2% that 1% hydrogen peroxide is provided and 8.3% consisting of 0.2% povidone-iodine usage in practice. (Shetty et al., 2013; Siddique et al., 2019).

Other than airborne transmission, the other mode of transmission is contact transmission through droplets (Wu et al., 2020). The rational use of personal protective equipment (PPE) has shown some degree of the spread of infections and allowing healthcare workers to provide crucial care to critically ill patients (Park et al., 2019). The current model of the correct proper sequence of PPE application being Gown- Mask-Goggles/Face Shield-Gloves is the current recommended protocol and our study reported 52.6% of professionals to do it correctly and the remaining 36.1 % donning gloves followed by a mask.

The application of PPE was sometimes 66.2% and always 26.3% and many still were not wearing 7.5% PPE for the procedure. This could have a devastating impact and could be a potential source of strength to various individuals (Subashri and Maheshwari, 2016; Rohini and Kumar, 2017; Teja and Ramesh, 2019). From the results achieved from the survey, it can be seen knowledge was seen to be adequate, but their implications in clinical practice were still varied and not wholly followed. The limitations of the study were limited sample size and more questions aimed at clinical practice guidelines would give a better perspective of the different treatment methodology followed during this pandemic.

The future scope being with the event of a pandemic it is of crucial importance to gain sufficient knowledge in this field to decrease the risk of transmission. A comparative evaluation between the general practitioners and specialists would have possibly shown the difference between the two population treatment during the pandemic.

CONCLUSION

Within the limitations of the study, it was observed that there was a good understanding about the precautionary measures to be undertaken by the dental practitioners. However, the implementation of such measures was still found to be inadequate or even lacking in some instances. This could have a negative impact and be a potential source for the spread of the disease in dental practice. Dentistry is known to be at very high risk, due to various aerosol producing treatment procedures being performed. To avoid this, dental practitioners are advised to follow the necessary protocols to reduce the risk of spread. Webinars and educational programs on implementing such safety measures can help the widespread reach of information in the dental fraternity, which in turn can help carry out dental practice with necessary precautions during this pandemic.

Conflict of Interest

The authors declare that they have no conflict of interest for this study.

Funding Support

The authors declare that they have no funding support for this study.

REFERENCES

- Andersen, K. G., *et al.* 2020. The proximal origin of SARS-CoV-2. *Nature Medicine*, 26(4):450–452.
- Ather, A., *et al.* 2020. Coronavirus Disease 19 (COVID-19): Implications for Clinical Dental Care. *Journal of Endodontics*, 46(5):584–595.
- Cheng, S. O., Khan, S. 2020. Europe's response to COVID-19 in March and April 2020-A letter to the editor on "World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19)". *International Journal of Surgery*, 76:71–77.
- Eggers, M., *et al.* 2018. In Vitro Bactericidal and Virucidal Efficacy of Povidone-Iodine Gargle/Mouthwash Against Respiratory and Oral Tract Pathogens. *Infectious Diseases and Therapy*, 7(2):249–259.
- Fehr, A. R., Perlman, S. 2015. Coronaviruses: An Overview of Their Replication and Pathogenesis. volume 1282, pages 1–23. Humana Press.
- Gorbalenya, A. E., *et al.* 2020. The species Severe acute respiratory syndrome-related coronavirus: classifying 2019-nCoV and naming it SARS-CoV-2. *Nature Microbiology*, 5(4):536–544.
- Janani, K., *et al.* 2020. Diagnostic accuracy of dental pulse oximeter with customized sensor holder, thermal test and electric pulp test for the evaluation of pulp vitality: an in vivo study. *Brazilian Dental Science*, 23(1):1–8.
- Jesudasan, J. S., *et al.* 2015. Effectiveness of 0.2% chlorhexidine gel and a eugenol-based paste on postoperative alveolar osteitis in patients having third molars extracted: a randomised controlled clinical trial. *British Journal of Oral and Maxillofacial Surgery*, 53(9):826–830.
- Jiang, S., *et al.* 2020. A different name is needed for the new coronavirus. *The Lancet*, 395(10228):949.
- Jose, J., *et al.* 2020. Different Treatment Modalities followed by Dental Practitioners for Ellis Class 2 Fracture – A Questionnaire-based Survey. *The Open Dentistry Journal*, 14(1):59–65.
- Kampf, G., *et al.* 2020. Persistence of coronaviruses on inanimate surfaces and their inactivation with biocidal agents. *Journal of Hospital Infection*, 104(3):246–251.
- Kumar, D., Antony, S. D. P. 2018. Calcified Canal and Negotiation-A Review. *Research Journal of Pharmacy and Technology*, 11(8):3727–3730.
- Li, W. 2005. Bats Are Natural Reservoirs of SARS-Like Coronaviruses. *Science*, 310(5748):676–679.
- Liu, Y., *et al.* 2020. The reproductive number of COVID-19 is higher compared to SARS coronavirus. *Journal of Travel Medicine*, 27(2):1–4.
- Manohar, M. P., Sharma, S. 2018. A survey of the knowledge, attitude, and awareness about the principal choice of intracanal medicaments among the general dental practitioners and nonendodontic specialists. *Indian Journal of Dental Research*, 29(6):716–720.
- Mohapatra, S., *et al.* 2019. Comparison of Antimicrobial Efficacy of Chlorhexidine Mouthwash, Lemon-grass (Cymbopogon) Oil and Neem (Azadirachta indica) Oil Against Oral Microflora: An in Vitro Study. *Indian Journal of Public Health Research & Development*, 10:369.
- Nasim, I., Hussainy, S., Thomas, T., Ranjan, M. 2018. Clinical performance of resin-modified glass ionomer cement, flowable composite, and polyacid-modified resin composite in noncarious cervical lesions: One-year follow-up. *Journal of Conservative Dentistry*, 21(5):510–510.
- Nasim, I., Nandakumar, M. 2018. Comparative evaluation of grape seed and cranberry extracts in preventing enamel erosion: An optical emission spectrometric analysis. *Journal of Conservative Dentistry*, 21(5):516–516.
- Noor, S., Pradeep 2016. Chlorhexidine: Its proper-

- ties and effects. *Research Journal of Pharmacy and Technology*, 9(10):1755–1760.
- Paramasivam, A., et al. 2020. A novel COVID-19 and its effects on cardiovascular disease. *Hypertension Research*, 43(7):729–730.
- Park, C. Y., et al. 2019. Global Shortage of Personal Protective Equipment amid COVID-19: Supply Chains, Bottlenecks, and Policy Implications. pages 1–10. ADB Briefs.
- Peng, X., Ren, B., et al. 2020. Transmission routes of 2019-nCoV and controls in dental practice. *International Journal of Oral Science*, 12(1):9.
- Prabakar, J., et al. 2018. Comparing the effectiveness of probiotic, green tea, and chlorhexidine- and fluoride-containing dentifrices on oral microbial flora: A double-blind, randomized clinical trial. *Contemporary Clinical Dentistry*, 9(4):560–569.
- Rajakeerthi, R., Nivedhitha, M. S. 2019. Natural Product as the Storage medium for an avulsed tooth – A Systematic Review. *Cumhuriyet Dental Journal*, 22(2):249–256.
- Rajendran, R., et al. 2019. Comparative Evaluation of Remineralizing Potential of a Paste Containing Bioactive Glass and a Topical Cream Containing Casein Phosphopeptide-Amorphous Calcium Phosphate: An in Vitro Study. *Pesquisa Brasileira em Odontopediatria e Clínica Integrada*, 19(e4668):1–10.
- Ramamoorthi, S., et al. 2015. Comparative evaluation of postoperative pain after using endodontic needle and EndoActivator during root canal irrigation: A randomised controlled trial. *Australian Endodontic Journal*, 41(2):78–87.
- Ramanathan, S., Solete, P. 2015. Cone-beam Computed Tomography Evaluation of Root Canal Preparation using Various Rotary Instruments: An in vitro Study. *The Journal of Contemporary Dental Practice*, 16(11):869–872.
- Ramesh, A., et al. 2016. Herbs as an antioxidant arsenal for periodontal diseases. *Journal of Intercultural Ethnopharmacology*, 5(1):92.
- Ravinthar, K., Jayalakshmi 2018. Recent Advancements in Laminates and Veneers in Dentistry. *Research Journal of Pharmacy and Technology*, 11(2):785–787.
- Rohini, S., Kumar, V. J. 2017. Incidence of dental caries and pericoronitis associated with impacted mandibular third molar-A radiographic study. *Research Journal of Pharmacy and Technology*, 10(4):1081–1084.
- Selvakumar, R., Np, M. 2017. Comparison in benefits of herbal mouthwashes with chlorhexidine mouthwash: A review. *Asian Journal of Pharmaceutical and Clinical Research*, 10(2):3–7.
- Shereen, M. A., et al. 2020. COVID-19 infection: Origin, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research*, 24:91–98.
- Shetty, S. K., et al. 2013. Compare the Efficacy of Two Commercially Available Mouthrinses in reducing Viable Bacterial Count in Dental Aerosol produced during Ultrasonic Scaling when used as a Preprocedural Rinse. *The Journal of Contemporary Dental Practice*, 14(5):848–851.
- Siddique, R., et al. 2019. Qualitative and quantitative analysis of precipitate formation following interaction of chlorhexidine with sodium hypochlorite, neem, and tulsi. *Journal of conservative dentistry*, 22(1):40–47.
- Sohrabi, C., et al. 2020. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). *International Journal of Surgery*, 76:71–76.
- Subashri, A., Maheshwari, T. N. U. 2016. Knowledge and attitude of oral hygiene practice among dental students. *Research Journal of Pharmacy and Technology*, 9(11):1840–1842.
- Teja, K. V., et al. 2018. Regulation of matrix metalloproteinase-3 gene expression in inflammation: A molecular study. *Journal of Conservative Dentistry*, 21(6):592–596.
- Teja, K. V., Ramesh, S. 2019. Shape optimal and clean more. *Saudi Endodontic Journal*, 9(3):235–236.
- Van Doremalen, N. 2020. Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. *The New England Journal of Medicine*, pages 1564–1567.
- Wax, R. S., Christian, M. D. 2020. Practical recommendations for critical care and anesthesiology teams caring for novel coronavirus (2019-nCoV) patients. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie*, 67(5):568–576.
- Wu, Y. C., et al. 2020. The outbreak of COVID-19. *Journal of the Chinese Medical Association*, 83(3):217–220.
- Zhang, T., et al. 2020. Probable Pangolin Origin of SARS-CoV-2 Associated with the COVID-19 Outbreak. *Current Biology*, 30(7):1346–1351.
- Zheng, Y. Y., et al. 2020. COVID-19 and the cardiovascular system. *Nature Reviews Cardiology*, 17(5):259–260.
- Zhu, N., et al. 2019. A Novel Coronavirus from Patients with Pneumonia in China. *New England Journal of Medicine*, 382(8):727–733.