

A Questionnaire-Based Study to Evaluate the Knowledge and Practice among Dental Students in Relation with Sars-Cov-2 in Maharashtra

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Abstract

Introduction: The outbreak of coronavirus disease 2019 (COVID-19) in the area of Wuhan City, Hubei Province, China, has evolved rapidly into a public health crisis and has spread exponentially to other parts of the world and is declared by the W.H.O as a pandemic. Dental students studying in institutes are at a very risk of contracting the virus as they are in large scale contact with patients as well as other students who can also be asymptomatic carriers. Thus, the aim of this study was to evaluate the knowledge and practical based views of dental students.

Materials and Method: A total of 12 knowledge-based questions and 16 practice-based questions were asked. The prepared questionnaire was distributed among under-graduate and post-graduate dental students of various dental institutes in the state of Maharashtra, India through a Google electronic survey system and their data were collected.

Results: 208 students participated in this survey, out of which 126 (60.6%) under-graduate students and 82 (39.4%) post-graduate students answered this survey over a span of 4 days. Mixed views regarding the knowledge and practice were observed among the students with respect to answers of the questions.

Conclusion: Owing to the mixed responses in this survey regarding dental students, limited knowledge will not be helpful in improving in their practices and only will lead to further toll on their mental health. Thus, SARS-Cov-2 education and preventive measures should be taught to every dental student as they are the future of dentistry.

Keywords: SARS-Cov-2; Dental Students; COVID-19

Introduction

The present outbreak of the 2019 coronavirus strain (COVID-19) constitutes a health emergency of global concern. On January 30, 2020, the World Health Organization (WHO) announced that this outbreak had constituted a public health emergency of international concern. The novel coronavirus was initially named 2019-nCoV and officially as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1].

The novel coronavirus has a close resemblance with other beta-coronaviruses such as SARS-CoV and MERS-CoV [2].

Given the widespread transmission of SARS-CoV-2 and reports of its spread to health care providers, dental professionals are at high risk for nosocomial infection and can become potential carriers of the disease. These risks can be attributed to the unique nature of dental interventions, which include aerosol generation, handling of sharps, and proximity of the operator to the patient’s oropharyngeal region. In addition, if adequate precautions are not taken, the dental institutes can potentially expose patients as well as the dental health care worker (DHCW) to cross contamination [3,4].

As of 26th June 2020, India has approximately 4.6 lakh cases and around 14 thousand deaths with surges of cases almost everyday in the country. Dental institutes can be considered as potential hotspots of transmission as there are gathering of thousands of personnel everyday on a daily basis. Also, there is a need to know the knowledge levels of dental students about novel virus and their views in adapting their practices and learning to the new environment as dental students are always considered as the future of dentistry in any country.

Aim of the Study

Thus, the aim of this survey was to infer the knowledge levels and practice views of future budding dentists and post-graduate students in relation to the current scenario of SARS-Cov-2 pandemic.

Materials and Methods

A self-administered questionnaire was designed containing questions based on the knowledge on SARS-Cov-2 and practice views in the current scenario. A total of 12 knowledge-based questions and 16 practice-based questions were asked. The prepared questionnaire was distributed among under-graduate and post-graduate dental students of various dental institutes in the state of Maharashtra, India through a Google electronic survey system and their data were collected. The first-year under-graduate dental students were excluded from this study due to their limited knowledge and practice in dentistry. The collected data was analyzed by using SPSS 10 computer software to get the results.

Results

208 students participated in this survey, out of which 126 (60.6%) under-graduate students and 82 (39.4%) post-graduate students answered this survey over a span of 4 days (Figure 1).

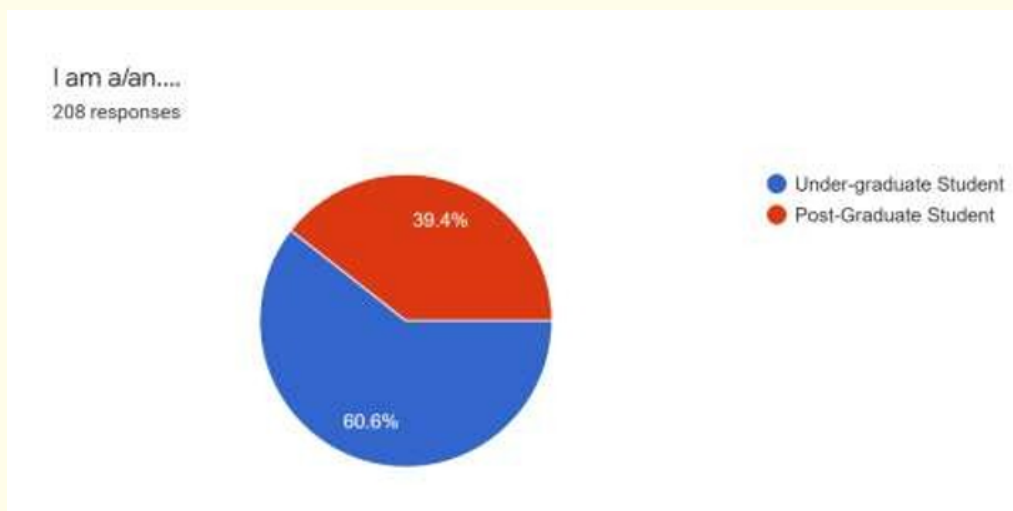
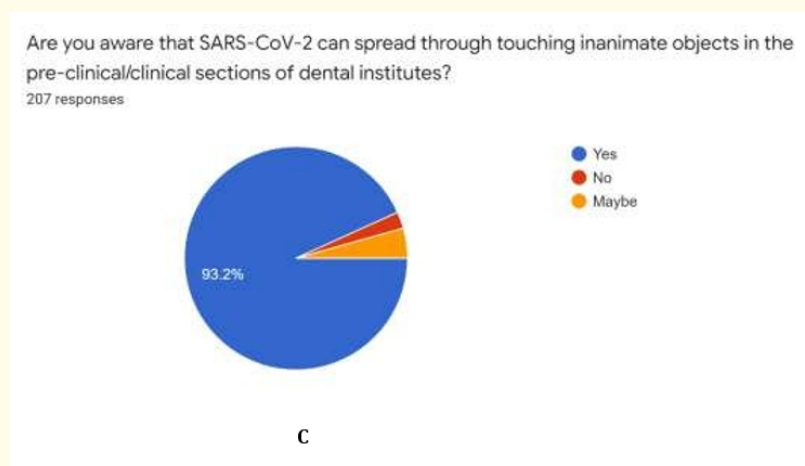
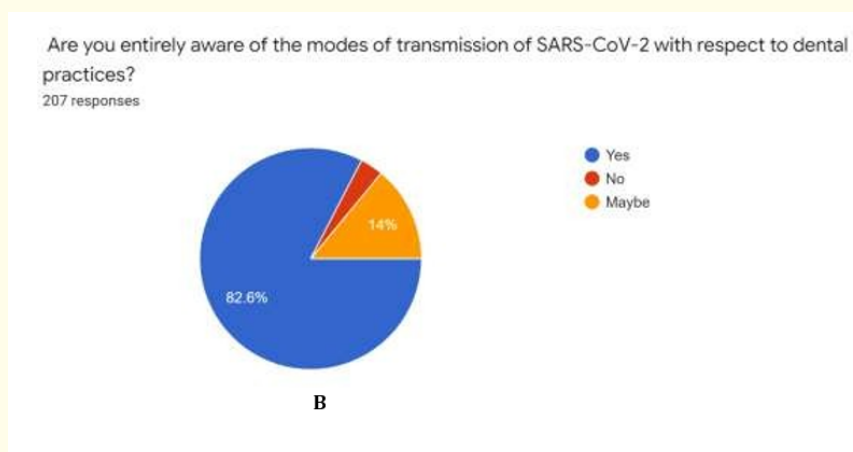
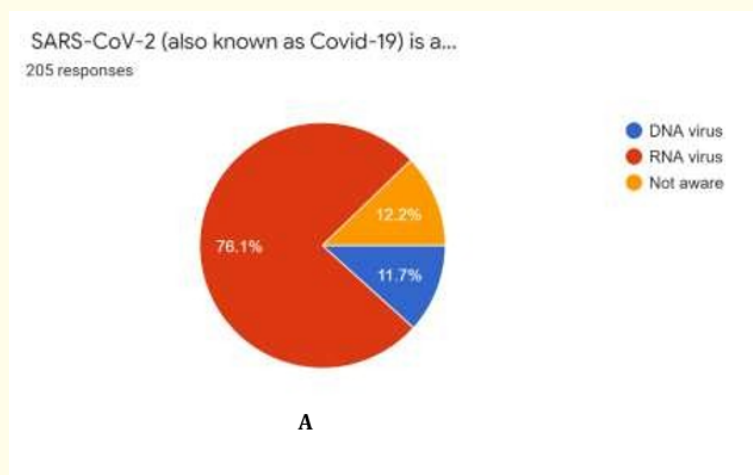
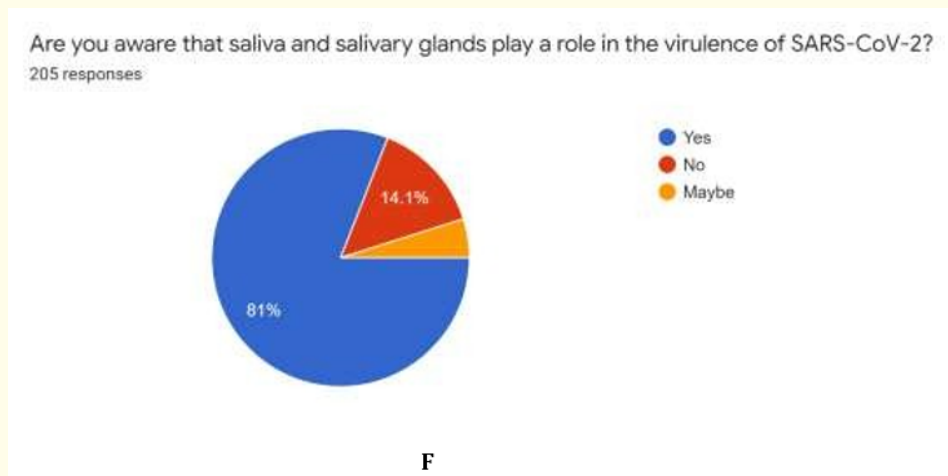
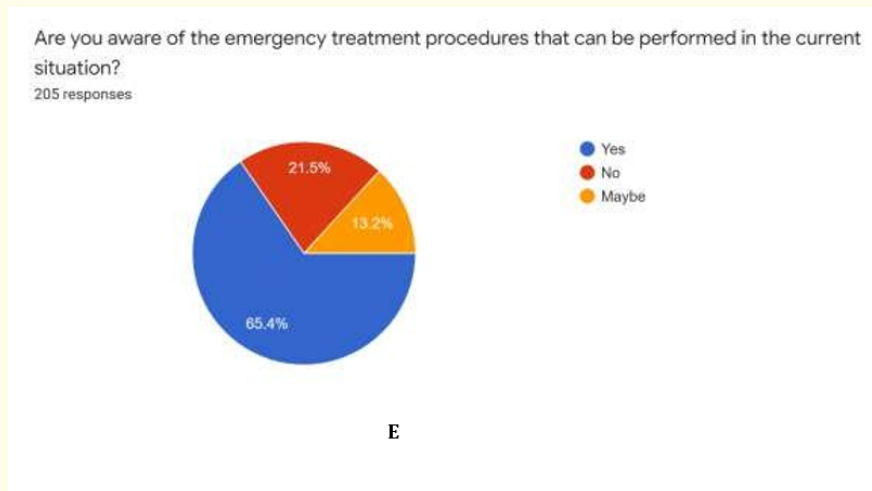
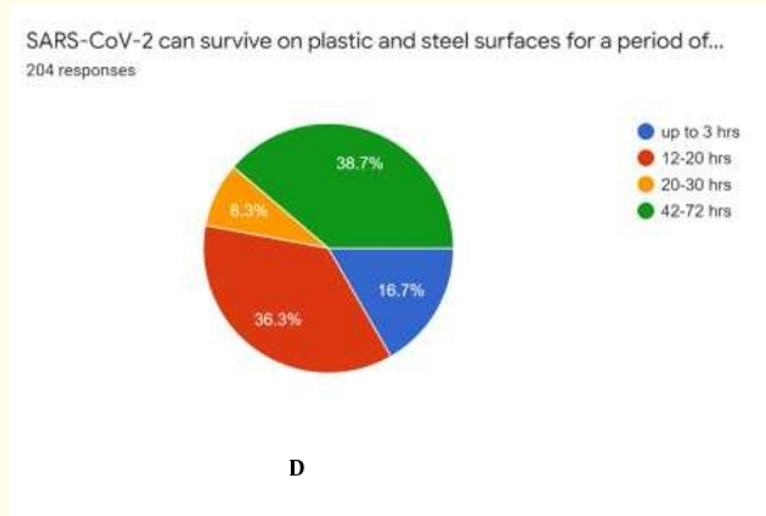
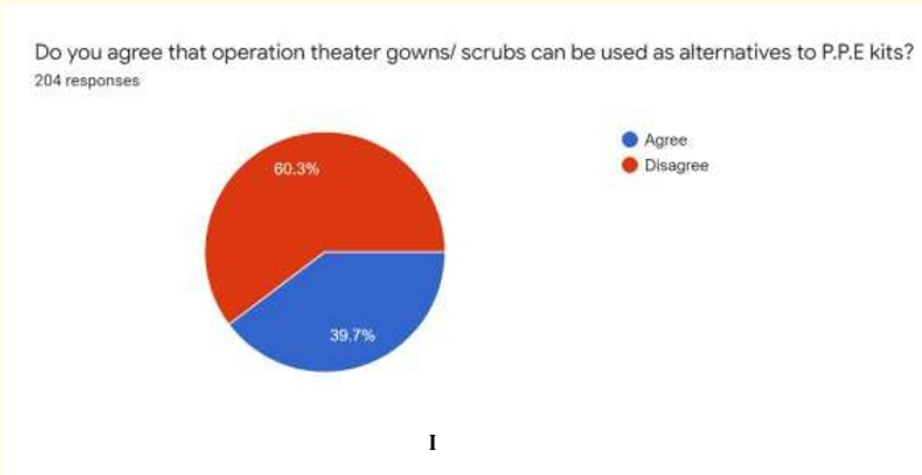
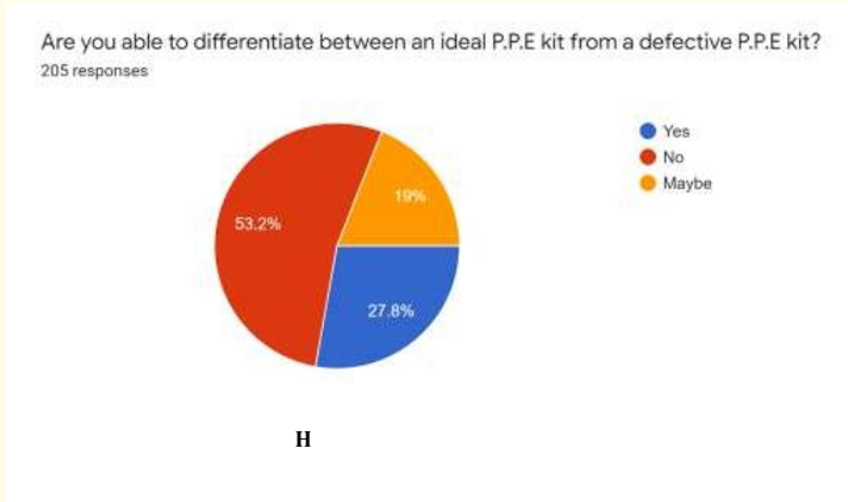
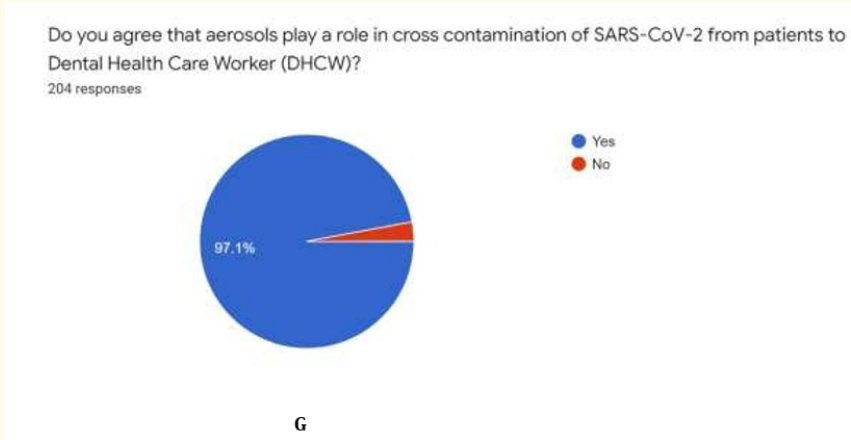


Figure 1: Information regarding the dental students this survey was distributed upon.

With respect to knowledge-based questions (Figure 2A-2L):







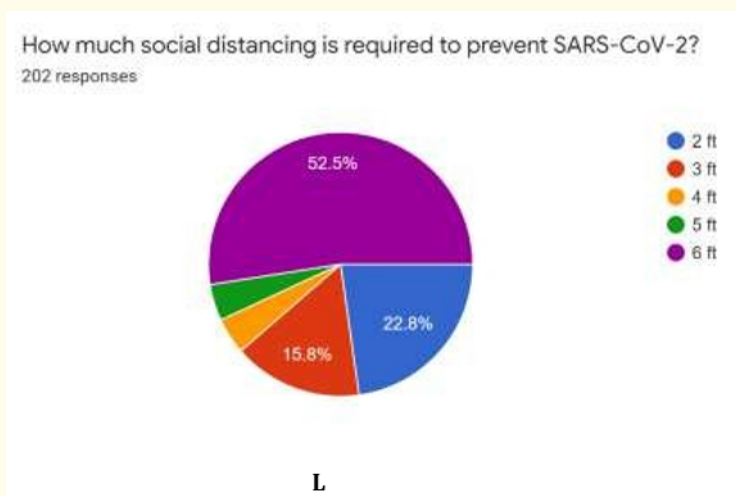
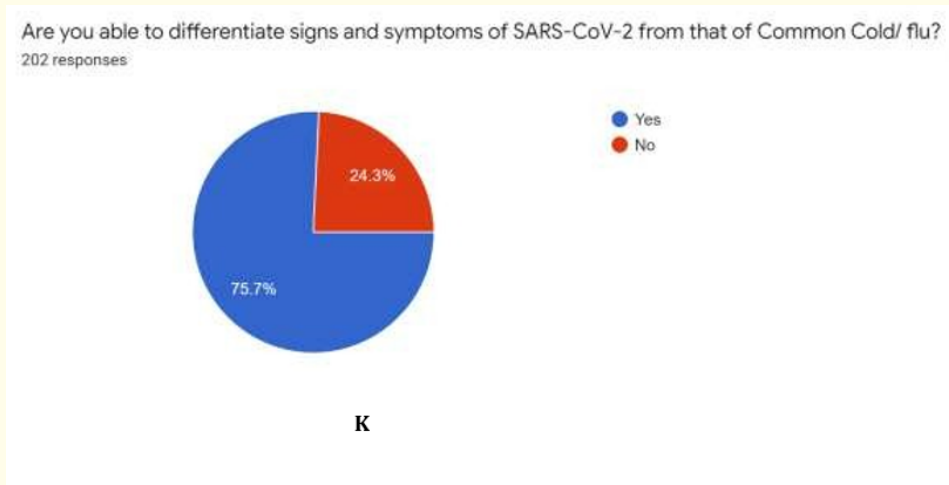
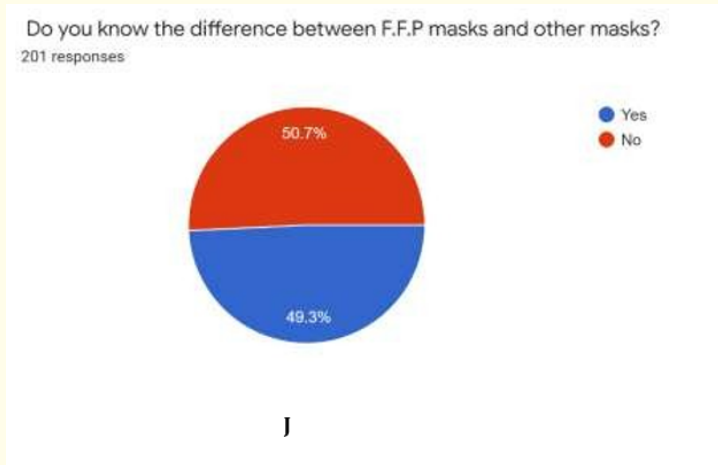
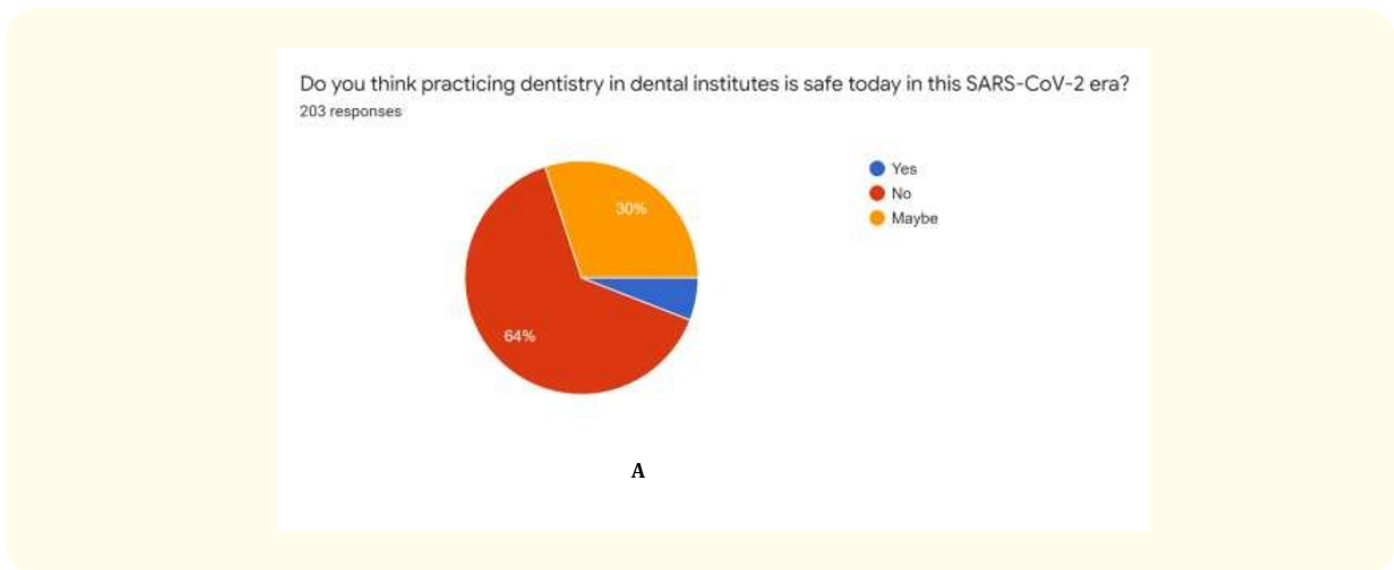
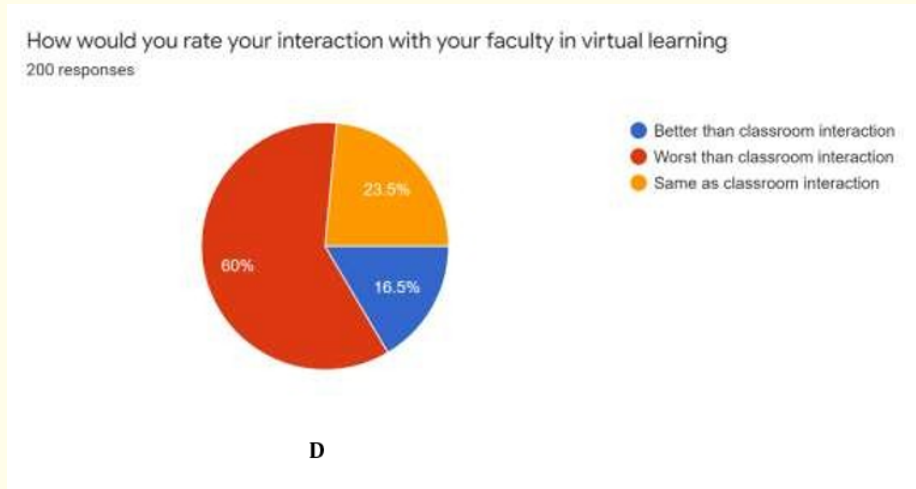
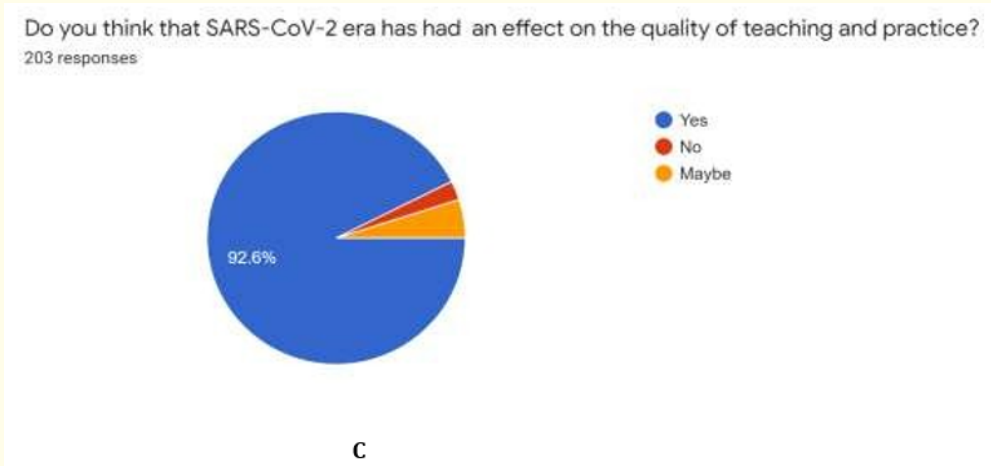
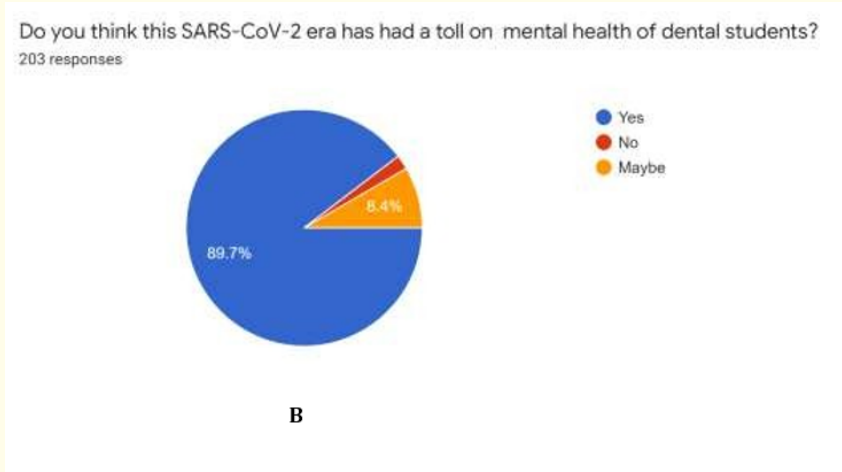


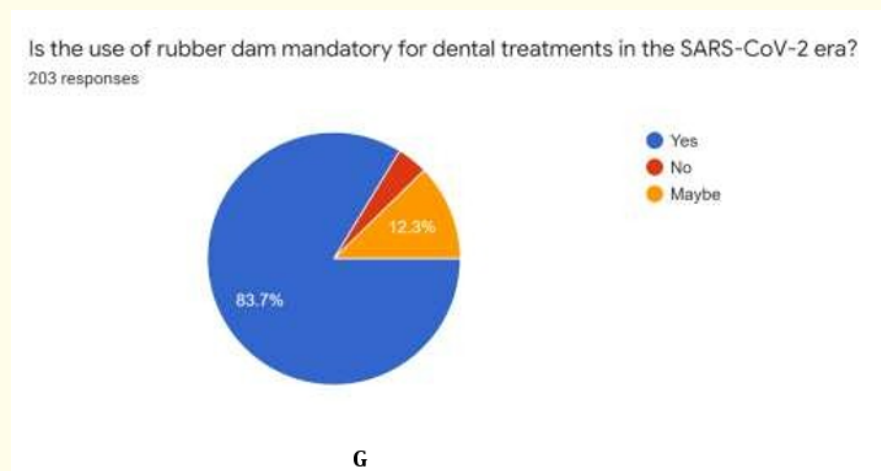
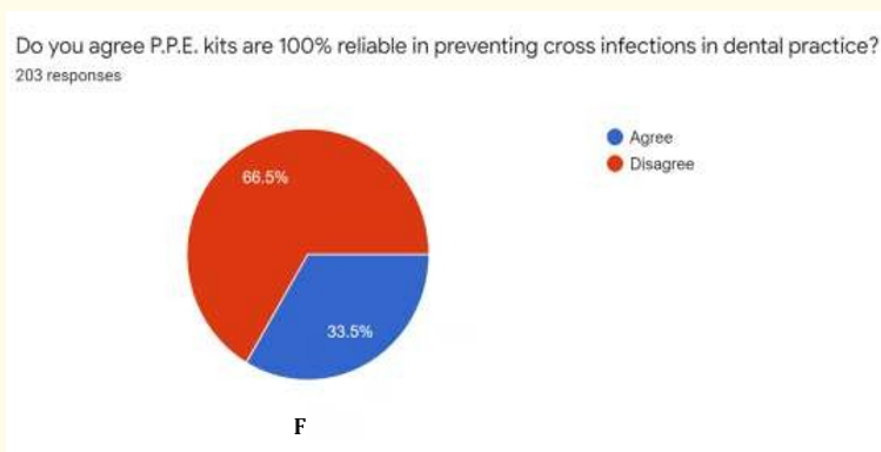
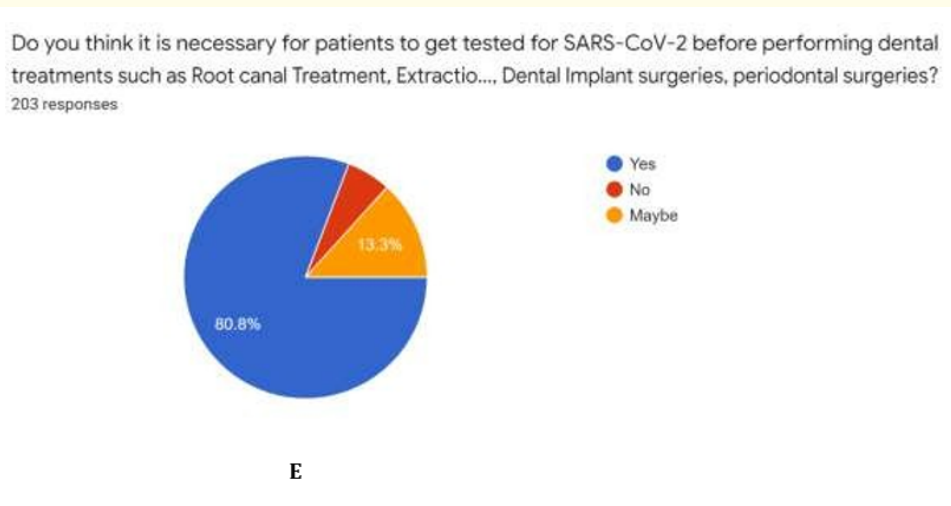
Figure 2A-2L: Knowledge based questions.

- 76.1% students considered that SARS-Cov-2 is an RNA virus while 11.7% students considered it as a DNA virus. 12.2% students were not aware of the viral genome.
- 82.6% of students were aware about the various modes of transmission of the virus while 14% were not aware of the modes of transmission.
- 93.2% of students were aware of the spread of infection through touching in- aminate objects in the pre-clinical and clinical sections of dental institutes while the rest were not aware or not sure about this mode of transmission.
- There was no significant difference in the views with respect to the survival rate of the virus on stainless steel and plastics as 38.7% students considered that virus could survive for a period of 42 - 72 hrs while 36.3% students considered that it could survive for a period of 12 - 20 hrs.
- 65.4% students were aware of the dental emergency treatment procedures to be provided in the current situation while 21.5% and 13.2% of students were either not aware of or not sure about the procedures respectively
- When it comes to the role of saliva and salivary glands in SARS-CoV-2, 81% of students were aware of the role of saliva in SARS-Cov-2 while 14.1% and 4.9% either didn't know or were not aware respectively.
- Majority of the dental students (93.1%) agreed that aerosols play a role in the cross contamination of SARS-Cov-2 from the patient to dental health care worker.
- 53.2% students were not able to differentiate between an ideal P.P.E kit from a defective kit while 27.8% of students were able to differentiate.
- With respect to use of operation theatre gowns/scrubs as alternate to P.P.E kits, 60.3% students disagreed to it while 39.7% agreed to the fact that it can be used as an alternative to it.
- There was no significant difference with regards to knowledge of students to differentiate between F.F.P masks and other masks (Yes- 50.7%, No- 49.3%).
- 75.7% students were able to differentiate between symptoms of SARS-Cov-2 and common cold/flu while 24.3% students were unable to differentiate.
- With regards to social distancing, 52.5% students were aware of maintenance of 6ft distance while 22.8% and 15.8% students considered a distance of 2ft and 3ft respectively.

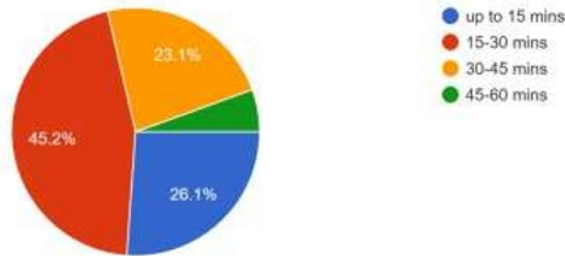
Practice based questions (Figure 3A-3P):





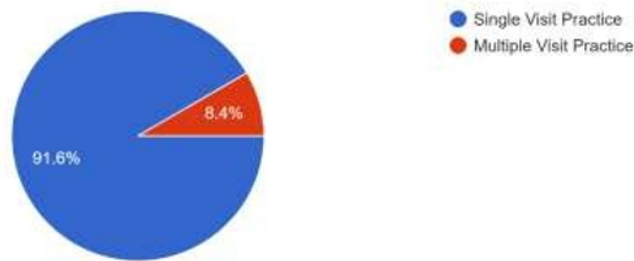


How much time frame duration do you recommend for treatment of patients in SARS-CoV-2 era?
199 responses



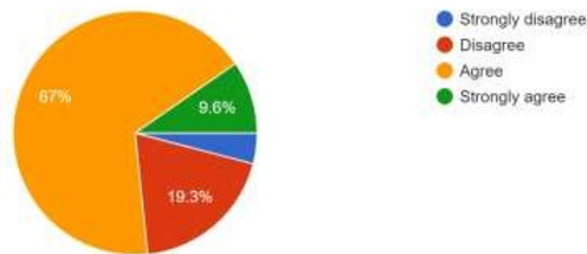
H

Which type of practice would you prefer in the SARS-CoV-2 era?
202 responses

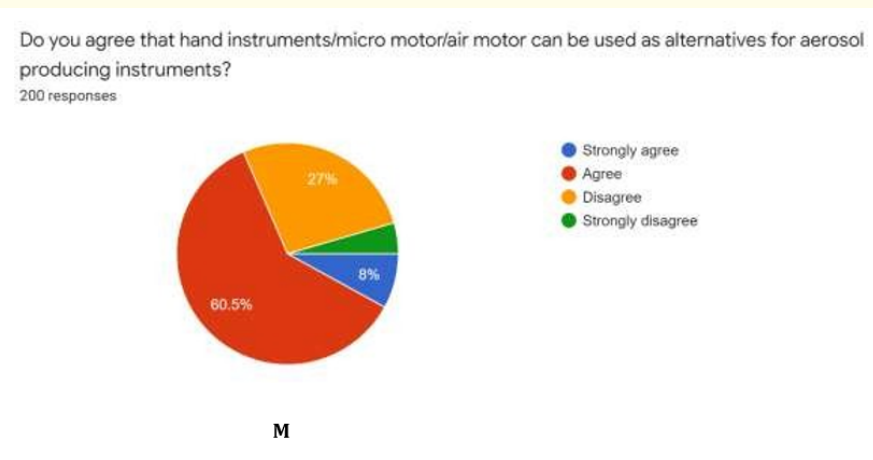
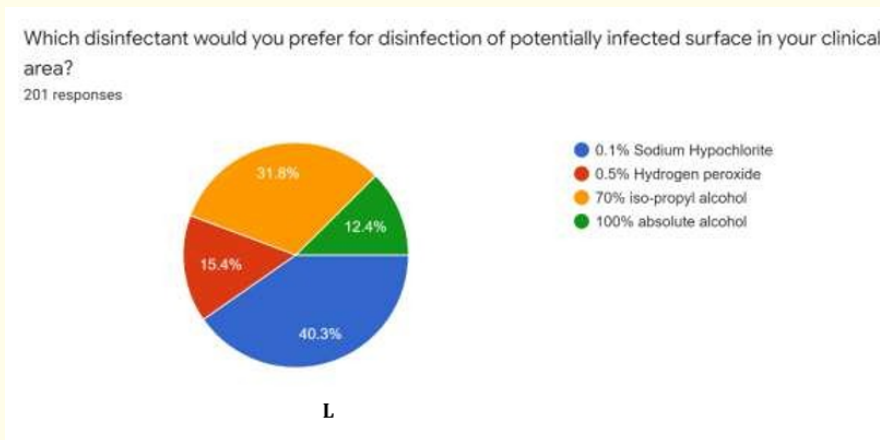
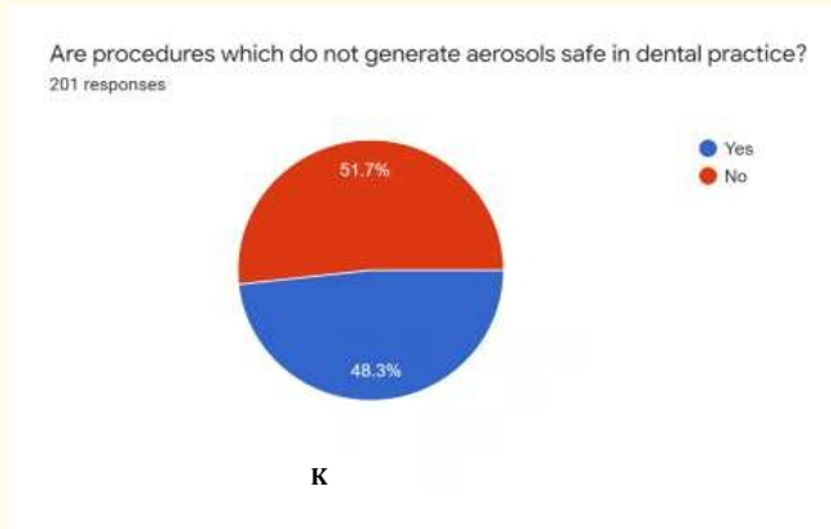


I

Do you agree that pre-operative mouth rinses of Povidone Iodine and Hydrogen Peroxide have an impact on aerosol-based transmission of SARS-CoV-2?
197 responses



J



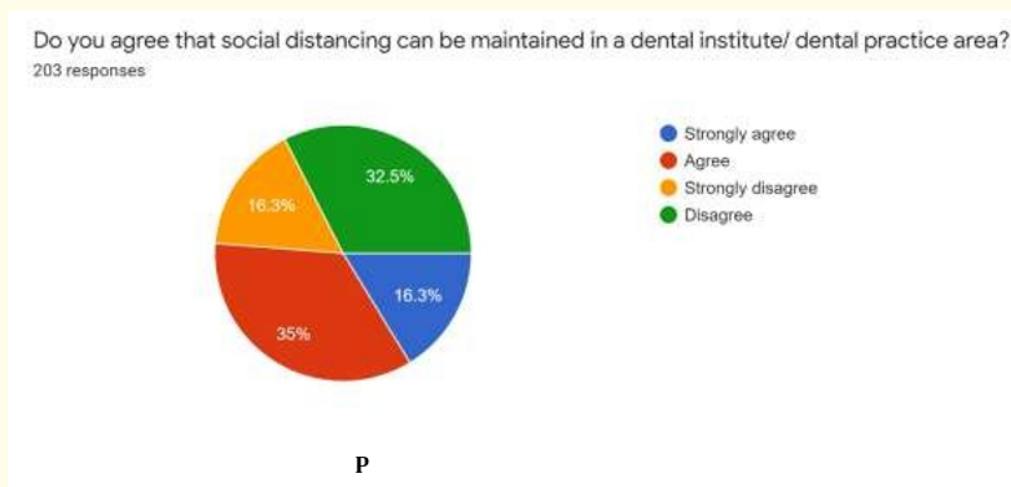
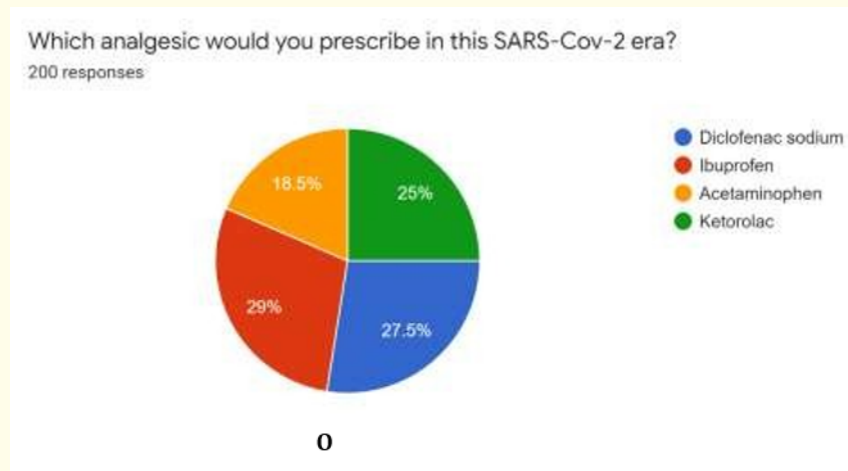
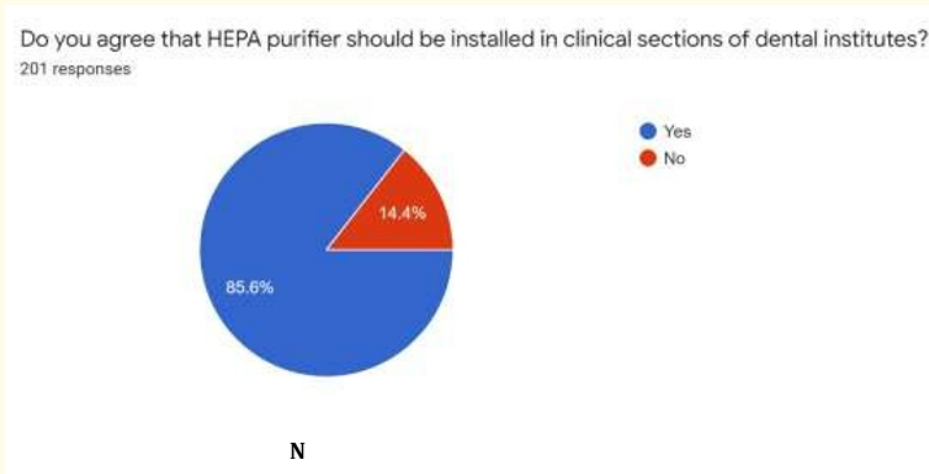


Figure 3A to 3P: Practice based questions.

- With respect to the safety of practicing dentistry in dental institutes, 64% of students considered it unsafe to practice while 30% of students were not sure whether it was safe to practice dentistry. 5.9% students accepted to the fact that dentistry is safe to practice.
- With regards to the toll on the mental health, 89.7% students considered that SARS-Cov-2 era of complete lockdown had a toll on the mental health of a dental student, while 8.4% students were not sure whether it had an effect or not.
- With regards to quality of teaching and practice in the current situation, 92.6% students considered that this era had an effect on teaching and practice, while 4.9% students were not sure.
- 60% of students felt that virtual learning was comparatively poor than classroom interaction while 23.5% and 16.5% students felt that the interactions were same or better than classroom respectively.
- 80.8% students agreed to the fact the patients should be tested for SARS- CoV-2 before carrying out dental procedures such as Root canal treatment, Extractions, minor surgical procedures, dental implants, periodontal surgeries while 13.3% were not sure.
- With respect to 100% reliability of safety of P.P.E kits in preventing cross- infections, 66.5% students disagreed to it while 33.5% agreed to it.
- 83.7% students considered rubber dam application was mandatory for dental treatments in this SARS-Cov-2 era.
- With regards to time frame duration of dental treatments during this pandemic, 45.2% students considered that the treatment duration should be for 15 - 30 minutes while 26.1% of dental students considered dental treatments up to 15 minutes. 23.1% students considered that treatment duration should be for 30 - 45 minutes while 5.5% students considered 45 - 60 minutes.
- A very high percentage of dental students considered performing single visit treatment practice (91.6%) over multiple visit treatment practice (8.4%).
- 67% students and 9.6% students agreed and strongly agreed to the fact that pre-operative mouth rinses of Povidone Iodine and hydrogen peroxide had an impact on aerosol-based transmission of SARS-Cov-2 respectively while 19.3% students disagreed to it.
- There was no significant difference that procedures not generating aerosols were safe in dental practices (Yes- 51.7% and No- 48.3%).
- With regards to the disinfectants used 40.3% students considered 0.1% sodium hypochlorite while 31.8% students considered 70% iso-propyl alcohol. 15.4% students and 12.4% students considered 0.5% hydrogen peroxide and 100% absolute alcohol respectively.
- 60.5% students agreed that hand instruments/air motor/micro-motor can be used as alternatives to aerosol producing instruments. At the same time 27% students and 8% students disagreed and strongly disagreed respectively.
- 85.6% considered that HEPA purifier should be installed in clinical sections of dental institutes while 14.4% did not.
- With respect to analgesic prescription, 29% considered Ibuprofen, 27.5% diclofenac sodium, 25% ketorolac and 18.5% acetaminophen respectively.
- With respect to maintaining social distancing in dental institutes, 35% agreed to the fact that social distancing can be maintained while 32.5% disagreed. 16.3% students strongly agreed and disagreed respectively.

Discussion

Coronaviruses (CoVs) belong to the subfamily Orthocoronavirinae in the family Coronaviridae, Order Nidovirales. There are four genera within the subfamily Orthocoronavirinae, namely Alphacoronavirus (α -CoV), Betacoronavirus (β -CoV), Gammacoronavirus (γ -CoV) and Deltacoronavirus (δ -CoV) [5].

The SARS-CoV genome is an enveloped, positive-sense, single-stranded RNA with a size varying between 26 kb and 32 kb, the largest genome of known RNA viruses. Both α - and β -CoV genera are known to infect mammals, whilst δ - and γ -CoVs infect birds. The novel

Coronavirus can be transmitted between humans via respiratory droplets. Notably, the respiratory tract is probably not the only route of transmission. Close contact is also a source of transmission of SARS-CoV-2. Virus replicates in ciliated epithelium that caused cellular damage and infection at infection site [6].

An important route of transmission is through infected droplets of SARS-CoV-2 land on inanimate objects such as plastics, metal surfaces and ceramics situated nearby an infected individual and are subsequently touched by other individuals. These objects more importantly plastic and metal instruments are most commonly present in the clinical area in a dental institute. Suman., *et al.* reported that the virus can last up to 48 - 72 hrs on the metal and plastic surfaces [7]. Also, Moriyama., *et al.* reported that the coronavirus can last about three days on a plastic surface as well as on stainless steel surface, it can also sustain for a period of one whole day on cardboard, while it can only sustain only for about four hours on a copper surface. Thus, disinfecting these surfaces with a potent disinfectant prior and after their use is a must to prevent cross- contamination [8].

The use of disinfectants decimates microorganisms such as virus or bacteria on inner layers or inert surfaces by acting as an antimicrobial agent. Disinfectants are not always effective against all kinds of microorganism such as bacterial spores unlike sterilisation, which kills all types of microorganisms by the use of extreme physical or chemical procedures. Sodium hypochlorite is a potent antimicrobial and a viricidal agent. It is used in 0.1% concentration as a disinfectant and its effect in cleaning potentially infected surfaces in the clinical area. Reports of its virucidal activity on HIV and HBV have also been observed [9]. Other disinfectants which can be used are Hydrogen peroxide, Iso-propyl alcohol and absolute alcohol. Kampf., *et al.* reported that a surface disinfection with 0.1% sodium hypochlorite, 0.5% hydrogen peroxide or 62% - 71% ethanol can be regarded as effective against corona viruses (SARS-CoV and MERS-CoV) within 1 minute. A similar effect can be expected against the SARS-CoV-2 [10]. Also, Chen., *et al.* reported disinfection of N-95 respirators using ionized hydrogen peroxide. 70 - 75% iso-propyl alcohol has been used as alcohol hand rubs which is an effective method of preventing transmission of virus [11]. Berardi reviewed the use of alcohol as a disinfectant against SARS-Cov-2 [12].

It is confirmed that SARS-CoV-2 reaches the cell in the same route as SARS coronavirus, i.e. via the cell receptor ACE2 (Angiotensin Converting Enzyme. SARS- CoV-2 can effectively use ACE2 as a receptor to invade cells, which can facilitate transmission from human to human. ACE2+ cells have been shown to be abundant in the respiratory tract as well as cells that are morphologically compatible with the epithelium of the salivary gland duct in human mouth. ACE2+ epithelial cells of salivary gland ducts have shown to be an early target of SARS-CoV infection and same might be the situation with SARS-CoV-2, although no research has been reported so far [13] Chen., *et al.* analysed saliva directly from the salivary gland opening and found SARS-CoV and isolated nucleic acid, indicating SARS-CoV contamination of salivary glands [14].

Therefore, there is a potential for transmission of COVID-19 via aerosol contributes to nosocomial spread in the dental office setting.

Patients with COVID-19 usually present with clinical symptoms of fever, dry cough, and myalgia. In addition, less obvious symptoms such as nausea, diarrhea, reduced sense of smell (hyposmia), and abnormal taste sensation (dysguesia) have also been reported. In addition, abnormal chest X-ray and computed tomographic findings such as ground-glass opacities are typically found in the chest. The incubation period of this virus is 3 - 7 days and as reported the virus remains in the body for 14 - 17 days [2,14].

An ideal Personal preventive equipment (PPE kit) consists of a N-95 respirator/F.F.P.- 2/F.F.P.-3 equivalent, a gown which covers from the neck to torso, face shield, head cap, shoe cover, protective eye wear. A PPE gown of 90 gsm is said to be an ideal gown for prevention of maximum transmission of SARS-CoV-2. Any kit below 50 gsm should not be considered. Reports suggest that maintaining a social distancing and P.P.E kit during treatment may prevent in cross contamination from patient to dental health care worker [15].

SARS-CoV-2 infections typically spread through respiratory droplets or by contact. Therefore, coughing or sneezing by an infected person can render SARS-CoV-2 airborne, potentially infecting individuals in close contact (within a radius of approximately 6 ft). This led to the recent recommendation of social distancing to minimize community spread of the disease [3,16].

Povidone-iodine (PVP-I), also known as iodopovidone, is an antiseptic used for skin disinfection before and after surgery. It may be used both to disinfect the hands of healthcare providers and operating site of the patient. It may also be used for minor wounds. It may be applied to the skin as a liquid or a powder and pre-operative mouth rinses [17,18].

According to Mady, *et al.* [19] the following outlines a stratified treatment approach:

- Apply nasal and oral PVP-I every 2-3 h, up to 4×/day in patients who are suspected/confirmed with SARS-CoV-2 infection.
- Are undergoing high-risk procedures (e.g. those involving nasal mucosal, oral, pharyngeal, and pulmonary secretions).
- Are from COVID-19 hotspots 2. Apply nasal and oral PVP-I prior to and after patient contact (with repeated contact, apply every 2 - 3h, up to 4×/day) in healthcare providers that:
- Are involved in care of patients with suspected/confirmed SARS-CoV-2 infection.
- Are involved in high-risk procedures of patients in COVID-19 hotspots.
- Lack adequate PPE (e.g. N95, PAPR).
- Optional nasal and oral application of PVP-I every 2-3 h, up to 4×/ day in patients and/or healthcare providers in:
- High-risk procedures in asymptomatic patients.
- COVID-19 hotspots.

Thus, pre-operative povidone iodine gargles should be used to minimise the viral loads in the saliva and to prevent the spread of virus through aerosol generating procedures.

HEPA (High-efficiency particulate air) filters is high enough to remove such virus- laden aerosols. According to the previous measurements, the efficiencies of HEPA are more than 95% for aerosols of diameter between 0.25 and 1.0 µm and nearly 100% for those with diameter larger than 2.5 µm. Air purifiers are affordable with enough clean air delivery rate (CADR, a figure of merit that is the cubic meter per hour of air that has had all the particles of a given size distribution removed) and low electric power consumption. Thus, is a low-cost alternative to sterilize the clinical sections of dental institutes [20,21].

Around majority of the students believed that dentistry is not safe to practice, SARS- CoV-2 pandemic has altered the ways of dental education and virtual learning is poor comparatively than classroom learning. However, adaption to the new dentistry will take time and there will be a day when dentistry will be safe again with a positive note with a lot of precautions.

Many students agreed to the fact that minimum treatment time (i.e. up to 15 minutes and 15 - 30 minutes) as well as preferred single visit treatment compared to multiple visits is the best way possible to restrict the spread of infections in a dental institute.

With regard to the selection of analgesics, Ibuprofen is not considered to be safe as reports have been observed that it aggravates the speed of infection. Acetaminophen is considered to be the safest analgesic in the given situation [22,23].

As analysing the mixed reviews and responses of dental students, dental education and practice-based knowledge of students should be improved in this SARS-Cov-2 pandemic as knowledge of the subject will improve their practices with precautionary measures. There is a known saying that “precaution is better than cure”.

Conclusion

Several universities, companies and research labs are working meticulously to develop faster testing, improved measures for prevention and treatment of COVID-19 infection. Evaluating the current scenario, students in a dental institute/hospital are at a greater risk for

contracting the virus hence virtual learning is the only way. Dental institutions should reevaluate their policies and should incorporate newer ways for providing distant education. Dental schools should also offer psychological help to those in need. Owing to the mixed responses in this survey, it is clear that the knowledge of these students regarding COVID-19 and their profession is not sufficient. Dental schools should train students since they have a critical role in this unprecedented worldwide challenge.

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