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The COVID-19 pandemic and orthodontic practice in Nigeria

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Abstract:

OBJECTIVES: This study was aimed at assessing the knowledge and awareness of orthodontists and orthodontic residents in Nigeria about the COVID-19 pandemic and the appropriate infection control measures required to mitigate its spread in orthodontic practice.

MATERIALS AND METHODS: It was a cross-sectional descriptive study of orthodontists and orthodontic residents. Ethical approval for the study was obtained from the Institutional Review Board. Data collection was via an online questionnaire designed using Google forms and these were sent to the phone numbers of study participants. Data analysis was done using Statistical Package for Social Sciences version 20.

RESULTS: A total of 73 respondents with a mean age of 43.41 ± 9.21 years participated in the study. About 90% of the respondents had a very good knowledge of COVID-19, including its etiology, modes of transmission, signs, and symptoms. However, very few respondents were aware of the less common symptoms such as skin rash (16.4%) and red eyes (26%). Over 80% of the respondents knew the appropriate measures to take to prevent the spread of the virus in the dental clinic, in addition to the appropriate personal protective equipment (PPE) to use.

CONCLUSION: The respondents had a very good knowledge of the basic epidemiology of COVID-19 and the means of prevention of its transmission in the dental clinic. However, there was limited knowledge of the less common symptoms of the infection. In addition, majority of the respondents had a very good idea of the appropriate PPE to be used.

Keywords:

COVID-19, Nigeria, orthodontic practice, orthodontist

Introduction

The novel coronavirus, Severe acute respiratory syndrome coronavirus 2 (SARS-COV-2) was discovered in China in 2019 and since then has spread very rapidly across the world, with the World Health Organization declaring COVID-19 a public health emergency of international concern on January 30, 2020, and a pandemic on March 11, 2020.^[1,2] Indeed, the world has not been the same since the discovery of the virus. This is because of the rapid

rate of spread and the huge numbers of hospitalizations and deaths recorded worldwide. Beyond this, the pandemic has also affected all spheres of life with far-reaching economic ramifications.

The COVID-19 pandemic has also had far-reaching effects on healthcare delivery worldwide and dental care in particular has been significantly affected because of the high risk of exposure that can occur to both patients and dental care professionals in the dental clinic, thus necessitating improved infection control practices.^[3-8] The pandemic paralyzed the global economy with lockdowns imposed in most parts of the world. The pandemic has also affected

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dental care delivery with most federal, regional, and local authorities in Nigeria advising the shutdown of dental and orthodontic facilities in order to reduce the risk of exposure, while providing only emergency dental and orthodontic care.^[6,7,9,10] In a very recent Nigerian study, carried out by the authors to assess the perceived impacts of the COVID-19 pandemic on orthodontic practice, the results showed that the pandemic had significant effects on the economic, social, and psychosocial lives of orthodontists and orthodontic residents in the country.^[11] As a follow-up to that study, it is important to find out how knowledgeable Nigerian orthodontists are about the virus and the appropriate infection control measures that have to be taken in order to prevent its spread in the dental clinic. Presently most countries around the world are gradually easing their restrictions with more dental and orthodontic clinics reopening. In Nigeria also, most dental clinics have reopened and therefore a greater focus is now being placed on putting appropriate measures in place to reduce the risk of infection in the dental clinic.

Orthodontists are at a great risk of high level of exposure to the virus in the dental clinic, if the appropriate infection control measures are not put in place.^[5,6] This is worsened by the fact that asymptomatic patients can spread the virus in the clinic, without either party knowing.^[4] In addition, children who form a large percentage of the patients seen in the orthodontic clinic have also been reported to be capable of being asymptomatic carriers.^[12,13] Furthermore, many of the routine procedures carried out in orthodontics, such as bonding and debonding, are aerosol-generating procedures and these procedures have been recorded as high risk in terms of transmission of the virus.^[3-6] Bearing in mind all these, the importance of a proper knowledge of the novel coronavirus and the appropriate infection control measures to employ in the dental clinic to prevent its spread are very important. In order to achieve this, orthodontists should have a sound knowledge and understanding of the epidemiology of the virus and how this will influence the new infection control measures they will now have to practice.

Thus, the aim of this study was to assess the knowledge and awareness of Nigerian orthodontists and orthodontic residents about the coronavirus and its implications for their practice of orthodontics, particularly with respect to measures aimed at mitigating the spread of the infection in the dental clinic.

Materials and Methods

This was a descriptive cross-sectional study with ethical approval obtained from the Institutional Review Board of Lagos University Teaching Hospital (LUTHHREC/EREV/0420/09). The study was conducted among orthodontists and orthodontic resident doctors in Nigeria.

Only consenting individuals participated in the study. The methodology utilized in this study was similar to that used by the authors, in a recent study carried out in the same population.^[11] Data were obtained through a self-administered online data collection platform (Google forms), between April and June 2020. Participants were contacted through the WhatsApp group platform of the Nigerian Association of Orthodontists and via direct individual WhatsApp messages.

The questionnaire contained three sections. One section covered participants' sociodemographics, another section documented participants' knowledge and awareness of the virus and pandemic, while the third section assessed the implications of the pandemic for orthodontic practice with respect to infection control. The reliability of the questionnaire was assessed with Cronbach's alpha with a minimum acceptable score of 0.7 set for the study.

A total of 73 out of 99 orthodontists and orthodontic residents in Nigeria participated in this study. A pilot study was done by sending the questionnaire to seven respondents to assess the validity of the research instrument. These were excluded from the samples used for this study. Data were analyzed using Statistical Package for Social Sciences version 20 (IBM Statistics, Armonk, NY, USA). Results were presented using tables. Level of statistical significance was set at $P < 0.05$.

Results

Seventy-three participants responded to the survey, with an overall response rate of 74.3%. The respondents consisted of 38 (52.1%) orthodontists and 35 (47.9%) orthodontic residents, who were mostly (89.0%) between 31- and 60-year age groups, with a mean age of 43.41 ± 9.21 years. Majority (86.2%) of the respondents were in their first 30 years post-qualifying as dental surgeons [Table 1]. A Cronbach's alpha score of 0.711 was recorded for the questionnaire, reflecting the reliability of the study instrument used in the study.

Table 2 shows that majority (98.6%) of the respondent rated their knowledge of COVID-19 as moderate-high while most (72.6%) of the respondents perceived COVID-19 infection as very dangerous. All the respondents felt the orthodontist's role in spreading information and increasing awareness concerning COVID-19 as moderate to very significant.

Table 3 shows that most (86.3%) of the respondents knew that COVID-19 is caused by SARS-COV-2 and almost all (94.6%) the respondents knew the average incubation period of the infection was 1–14 days. All the respondents knew that COVID-19 was a viral

Table 1: Demographics of respondents

Demographic characteristic	Gender		Total n (%)
	Female n (%)	Male n (%)	
Age groups (years)			
21-30	3 (6.3)	2 (8.0)	5 (6.8)
31-40	19 (39.6)	7 (28.0)	26 (35.6)
41-50	15 (31.3)	12 (48.0)	27 (37.0)
51-60	10 (20.8)	2 (8.0)	12 (16.4)
61-70	1 (2.1)	2 (8.0)	3 (4.1)
Total	48 (100.0)	25 (100.0)	73 (100.0)
Number of years post-BDS* graduation			
1-10	12 (25.0)	3 (12.0)	15 (20.5)
11-20	20 (41.7)	13 (52.0)	33 (45.2)
21-30	8 (16.7)	7 (28.0)	15 (20.5)
31-40	8 (16.7)	1 (4.0)	9 (12.3)
41-50	0 (0.0)	1 (4.0)	1 (1.4)
Total	48 (100.0)	25 (100.0)	73 (100.0)
Current status of practice			
1 st year junior resident	4 (8.3)	2 (8.0)	6 (8.2)
2 nd year junior resident	4 (8.3)	2 (8.0)	6 (8.2)
3 rd year junior resident and above	2 (4.2)	1 (4.0)	3 (4.1)
1 st year senior resident	2 (4.2)	3 (12.0)	5 (6.8)
2 nd year senior resident	1 (2.1)	0 (0.0)	1 (1.4)
3 rd year senior resident and above	11 (22.9)	3 (12.0)	14 (19.2)
Specialist/Consultant orthodontist	24 (50.0)	14 (56.0)	38 (52.1)
Total	48 (100.0)	(100.0)	73 (100.0)

*BDS=Bachelor of Dental Surgery

Table 2: Perception and self-rating of knowledge

	Frequency (n)	Percentage
How would you rate your knowledge of COVID-19?		
Low	1	1.4
Moderate	51	69.9
High	21	28.7
What is your perception concerning COVID-19 infection?		
Not dangerous at all	0	0.0
Moderately dangerous	20	27.4
Very dangerous	53	72.6
What is your perception concerning the vulnerability of orthodontists to COVID-19 infection?		
Not risky at all	0	0.0
Moderately risky	25	34.2
Very risky	48	65.8
How do you consider the orthodontists' role in spreading information and increasing awareness concerning COVID-19?		
Insignificant	0	0.0
Moderately significant	19	26.0
Very significant	54	74.0

infection. All the respondents indicated that shortness of breath was a symptom of COVID-19 while only a few felt that skin rash (16.4%) and red eyes (26%) were also symptoms. All the respondents identified coughing, sneezing, and touching of contaminated surfaces as a means of transmission of the virus. Majority of respondents believed that a patient is high risk for COVID-19 if there was a positive history of contact with an infected person whilst only about a

quarter (28.8%) considered patients presenting with diarrhea as such.

All the respondents indicated that transmission of COVID-19 could be prevented by regular hand washing with soap and water, use of alcohol-based hand rub, and routine disinfection of contaminated surfaces. Keeping known or suspected cases in well-ventilated rooms was the least (69.9%) opinion expressed.

Table 3: Knowledge of COVID-19

	Frequency (n)	Percentage
COVID-19 is caused by an organism called?		
SARS-COV-1	9	12.3
SARS-COV-2	63	86.3
MERS-COV	1	1.4
The average incubation period of COVID-19 is?		
1-3 days	2	2.7
1-7 days	2	2.7
1-14 days	69	94.6
What are the symptoms of COVID-19?		
May be asymptomatic	71	97.3
Fever	73	100
Cough	72	98.6
Sore throat	66	90.4
Shortness of breath	73	100
Diarrhea	53	72.6
Vomiting	25	34.2
Running nose	35	47.9
Red eyes	19	26.0
Skin rash	12	16.4
Joint/Muscle pain	53	72.6
How can COVID-19 be transmitted?		
Coughing and sneezing	73	100
Hand shaking	67	91.8
Touching contaminated surfaces	73	100
Talking	49	67.1
I don't know	0	0.0
What factor(s) will you consider in determining if a patient is a high risk for COVID-19?		
Presence of symptoms of a respiratory infection	69	94.5
Presence of symptoms of diarrhea	21	28.8
History of travel to areas experiencing	73	100
History of contact with possible infected people	72	98.6
How can COVID-19 transmission be prevented?		
Regular hand washing with soap and water	73	100
Use of alcohol-based hand rub	73	100
Routine disinfection of contaminated surfaces	73	100
Use of personal protective clothing	72	98.6
Use of facemasks by known or suspected individuals	69	94.5
Keeping known or suspected cases in well ventilated rooms	51	69.9

*MERS-CoV=Middle East respiratory syndrome Coronavirus

Table 4 shows that most (89.0%) of the respondents felt that they knew the personal protective equipment to use in providing dental treatment for COVID-19 patients. Goggles or face shields were the most (94.5%) opined to be used when carrying out a non-aerosol-generating procedure in the dental clinic for a suspected or confirmed case of COVID-19 while non-sterile disposable gloves were the least (27.4%) proposed. Goggles or face shield was opined to be used by all respondents when carrying out an aerosol-generating procedure in the dental clinic for a suspected or confirmed case of COVID-19 while non-sterile disposable gloves were the least (24.7%) proposed. A fair proportion (60.3%) of the participants felt they knew how to perform isolation procedures

on patients to minimize chances of exposure in case of contact with confirmed COVID-19 patients.

Table 5 shows that most (89.0%) indicated that they would be willing to provide orthodontic treatment to an unsuspected/unconfirmed COVID-19 patient whereas only 16.4% indicated willingness to provide orthodontic treatment to a suspected/confirmed COVID-19 patient.

Majority (97.3%) of the respondents indicated that they would institute social distancing in their clinic waiting rooms as a precautionary measure in providing orthodontic treatment in the aftermath of the pandemic, whereas only 1.4% indicated they would encourage patients to brush their teeth before being seen as a precautionary

Table 4: Appropriate use of PPE

	Frequency (n)	Percentage
In the case of providing dental treatment for COVID-19 patients, do you know which personal protective equipment (PPE) to use?		
Yes	65	89.0
No	1	1.4
I am not sure	7	9.6
When carrying out a non-aerosol-generating procedure in the dental clinic for a suspected or confirmed case of COVID-19, which of the following are the basic recommended PPE by the WHO?		
Goggles or face shield	69	94.5
Medical mask	49	67.1
Gown	37	50.7
Non-sterile disposable gloves	20	27.4
Sterile gloves	61	83.6
Respirator (N95 or FFP2)	48	65.8
Sterile gown	45	61.6
When carrying out an aerosol-generating procedure in the dental clinic for a suspected or confirmed case of COVID-19, which of the following are the basic recommended PPE by the WHO?		
Goggles or face shield	73	100.0
Medical mask	38	52.1
Non-sterile gown	21	28.8
Non-sterile disposable gloves	18	24.7
Sterile gloves	68	93.2
Respirator (N95 or FFP2)	71	97.3
Sterile gown	62	84.9
In case of contact with confirmed COVID-19 patients, do you know how to perform isolation procedures on the patients to minimize chances for exposure?		
Yes	44	60.3
No	29	39.7

PPE=Personal protective equipment, FFP2=Filtering facepiece 2

measure. Majority (95.9%) of the respondents considered bonding brackets on a new orthodontic patient a high-risk procedure in orthodontic practice for the spread of COVID-19 while only a few (32.9%) considered fitting a removable appliance as high risk.

Most (79.5%) of the respondents would refer a patient, who sneezes or coughs persistently while in their clinic, to the hospital without treating them while only 9.6% of the respondents indicated that they would treat such patients and then ask them to go to the hospital afterward.

Majority (90.4%) of the respondents knew who to contact if they had an unprotected exposure to a patient with a known or suspected COVID-19, whereas only 5.5% did not know what to do if they had an unprotected exposure to a patient who is known or suspected to have contracted COVID-19.

Majority (91.8%) of the respondents indicated that they would self-isolate immediately if they had an unprotected exposure to a patient who is known or suspected to have COVID-19 while only 1.4% indicated that they would have a hot bath immediately, start to boost their immune systems and contact the authorities immediately.

Discussion

There are currently close to 100 orthodontists and orthodontic residents in Nigeria, serving a population of close to 200 million.^[11] There are presently about 3000 practicing dentists in the country, thus the orthodontist:patient ratio is very low. Seventy-three respondents participated in this study, which is representative of the study population, which focused on orthodontists and orthodontists in training. It is interesting to note that there were almost twice as many females compared to male respondents who participated in the study and this reflects the female dominance of the orthodontic profession in Nigeria.

The importance of oral health professionals, particularly dentists and orthodontists, having a good knowledge and understanding of the COVID-19 infection, cannot be overemphasized. Indeed, dental health-care professionals, orthodontists inclusive, work in the oral cavity which serves as a portal of entry and exit of the SARS-COV-2 virus, increasing their risk of infection.^[14,15] In addition, most of the procedures performed in the dental setting are capable of generating aerosols; this places the dental health-care workers as well patients visiting the clinic at greater risk of getting infected.^[3-6]

Table 5: Implications for treatment

	Frequency (n)	Percentage
Will you be willing to provide orthodontic treatment to an unsuspected/unconfirmed COVID-19 patient?		
Yes	65	89.0
No	8	11.0
Will you be willing to provide orthodontic treatment to a suspected/confirmed COVID-19 patient?		
Yes	12	16.4
No	61	83.6
What precautionary measures will you take in providing orthodontic treatment in the aftermath of the pandemic?		
Social distancing in clinic waiting room	71	97.3
Patients will be asked to wear facemasks while in the waiting room	64	87.7
Patients will be asked to wash their hands before sitting on the dental chair	68	93.2
Use of PPE by the dental staff members	70	95.9
Treatment of patients in very well ventilated rooms	68	93.2
Use of recommended antibacterial mouth rinses before commencing treatment	61	83.6
Remove books, magazine and toys from waiting room	2	2.7
Patient will be encouraged to brush before being seen	1	1.4
Wear footwear or disinfect their shoes	2	2.7
Which of the following procedures will you consider as high-risk procedures in orthodontic practice for the spread of COVID-19?		
Arch wire change	29	39.7
De-bonding a patient with fixed appliance	60	82.2
Fitting a removable appliance	24	32.9
Bonding brackets on new orthodontic patient	70	95.9
If a patient sneezes or coughs persistently while in your clinic, how will you react?		
I will refer the patient to the hospital without treating him/her	58	79.5
I will treat the patient and ask him/her to go to the hospital afterward	7	9.6
I'm not sure of what to do	8	11.0
Do you know who to contact if you have an unprotected exposure to a patient with known or suspected COVID-19?		
Yes	66	90.4
No	1	1.4
I have an idea, but I'm not sure	6	8.2
Do you know what to do if you have an unprotected exposure to a patient with known or suspected COVID-19?		
Yes	61	83.6
No	4	5.5
I have an idea, but I'm not sure	8	11.0
What will you do if you have unprotected exposure to a patient with known or suspected COVID-19?		
Go to the hospital immediately for test	23	31.5
Self-isolate immediately	67	91.8
Contact the concerned authorities	65	89.0
I don't know what to do	0	0.0
Have a hot bath immediately	1	1.4
Start to boost my immune system	1	1.4
Contact the authorities immediately	1	1.4

PPE=Personal protective equipment

Sufficient knowledge and meticulous infection control practices are therefore mandatory to reduce the risk of cross-infection among dental health-care practitioners and patients.

Based on the above, the fact that almost all the respondents rated their knowledge of COVID-19 as either "moderate" or "high" is commendable. Although this assessment is quite subjective, their response to questions on the epidemiology of the virus further corroborates this and this is highlighted in greater

detail below. In tandem with their perceived level of knowledge, they considered the orthodontists' role in information, dissemination, and awareness creation on COVID-19 to be very significant. This is quite true, as all health-care professionals including orthodontists have a key role to play in enlightening members of the public about the virus.

It is noteworthy that a vast majority of respondents (71.6%) perceived COVID-19 as "very dangerous" and considered the orthodontist at high risk of contracting the

disease. Some of the possible reasons for the perceived dangerous nature reported by the surveyed population may include the lack of an evidence-based definitive cure for the COVID-19 disease;^[16] the mortality rates for persons infected with COVID-19 is increasing when the individual is above 40 years old,^[17] as well as a global death rate of over 746,000 due to COVID-19 pandemic since first reported in December 2019 in Wuhan, China.^[18] The demographic characteristics of the orthodontists and orthodontic residents who participated in the study revealed approximately 60% to be above 40 years. This is however at variance with the responses among Jordanian dentists, in which most of them (71.7%) considered the disease to be moderately dangerous. This may be due to the absence of any “local cases” of COVID-19 in Jordan as at the time of the survey was conducted.^[14] Another possible reason for this may be the fact that the study was carried out much earlier, when there was still limited knowledge of the epidemiology of the virus. It is possible that with more information now available on the highly infectious nature of the virus, dentists and orthodontists may come to perceive it as a very dangerous infection, particularly because of the high possibility of spread in dental settings. This will ultimately translate to them taking appropriate infection control precautions in the care of patients.

The SARS-COV-2 virus is a novel virus and the World Health Organization is doing its best to educate the world on its research findings concerning this most contagious virus. Various avenues have been used to disseminate information resulting in not only health personnel but also the general populace acquiring basic knowledge about the incubation period, transmission routes, and signs and symptoms of COVID-19. The viral incubation period of 1–14 days^[19] was known by the majority of participants who also had a good knowledge of the name and type of the novel coronavirus. This is probably due to the constant media awareness campaigns carried out in Nigeria as well as on the foreign media, information from webinars and the internet.

The manifestation of COVID-19 is diverse; infected persons can be either asymptomatic or symptomatic and demonstrate a range of the disease spanning a mild, moderate, or severe form.^[6] This disease has been seen to have no specific presentation and may differ from individual to individual.^[20-23] It is imperative to be able to recognize high-risk patients at this time of pandemic. It therefore behooves all orthodontists to have a firm knowledge of the various manifestations in order to be able to take a good history and quickly recognize COVID-19 patients. However, certain signs and symptoms have constantly been associated with it, which include an elevated temperature, a persistent dry cough, joint and muscle pain, shortness of breath,

and generalized fatigue.^[6] Study participants were conversant with all these symptoms as well as an initially less known symptom of diarrhea.^[23] Vomiting, red eyes, runny nose, and skin rash were less known symptoms of the disease^[24,25] by participants. This may be due to the fact that the major symptoms are more projected by the media than the minor and evolving ones. Thus, there may be a need to reemphasize these less known symptoms of COVID-19 in training courses on infection control organized for orthodontists and dentists in general. This is because some patients may present in the clinic with some of these less common symptoms and it is important for the orthodontist or orthodontic resident to be able to identify them and thus refer or treat the patient appropriately.

Our study participants were knowledgeable about the transmission routes of the virus, which is mainly through respiratory droplets by way of coughing and sneezing, as well as contact with surfaces contaminated by the virus and through aerosol-generating procedures. Modes of prevention, which included good respiratory and hand hygiene, were also well known by the participants. The knowledge of these by the orthodontists and orthodontic residents will enable them to adequately protect themselves from infection by using appropriate personal protective equipment (PPE) and practicing good respiratory and hand hygiene.^[3-5]

Most of the respondents felt that they knew which PPE to use in providing dental treatment for COVID-19 patients. Goggles or face shield were the most opined to be used when carrying out both aerosol and non-aerosol-generating procedures in the dental clinic for a suspected or confirmed. The procedure of bonding brackets for a new orthodontic patient is aerosol generating and therefore was considered a high-risk procedure in orthodontic practice by almost all the respondents. This high knowledge base among the respondents was also reported among Jordanian dentists^[14] as more than half of the participants in this study felt they knew how to perform isolation procedures on patients to minimize chances of exposure in case of contact with confirmed COVID-19 patients. PPE which includes facial mask, face shield, eye protection, gowns, and gloves are very important protective devices during the COVID-19 outbreak.^[26-28]

It is interesting to note that while most respondents had a general idea of the appropriate PPE to use for aerosol and non-aerosol-generating procedures, certain details were missed by some of the respondents. Many recorded the use of sterile gloves and sterile gowns which are not mandatory for seeing non-COVID-19 patients, as non-sterile gloves and latex gloves have been reported to be suitable for use in seeing both groups of

patients.^[29] Thus, there is a greater need for training on the appropriate PPE to be used for different orthodontic procedures. In addition to this, although this was not assessed in the study, it is important that orthodontists have a good knowledge of the right procedures for donning and doffing PPE in the dental clinic.

This study shows that most of the respondents were willing to provide orthodontic treatment to an unsuspected/unconfirmed COVID-19 patient, whereas only few of them were willing to provide orthodontic treatment to a suspected/confirmed COVID-19 patient. This is likely due to the morbid fear of the possibility of disease transmission during incubation periods and the pathogenicity of the virus.^[4] This may also account for the reason why most of the respondents preferred to refer a patient, who sneezes or coughs persistently while in their clinic to the hospital without treating them.

In this study, majority of the respondents indicated that they would institute social distancing in their dental clinic waiting rooms, hand hygiene, and use of facemasks by patients as precautionary measures in providing orthodontic treatment in the aftermath of the pandemic. This is in line with recommendations from previous reports.^[5,26-30] However, very few respondents highlighted the need to take out toys, books, and magazines from the clinic waiting rooms as a form of maintaining infection control. This is very important as they may also serve as possible means of spread of the virus in the clinic.^[31] Thus, it is important that all such items are removed from the clinic waiting area to reduce the risk of contamination and spread of the virus.

An overwhelming majority of the respondents in this study knew who to contact and also knew that they should self-isolate if they had an unprotected exposure to a patient with known or suspected COVID-19; this was far more than in previous studies.^[14] This may be due to the present global increase in the awareness concerning COVID-19.

Dentists and orthodontists should abide by the relevant guidelines and take strict personal protection measures to minimize or avoid procedures that may generate aerosols.

Conclusion

Majority of the orthodontists and orthodontic residents had a very good knowledge of the basic epidemiology of COVID-19. However, only few respondents were able to identify the less common symptoms of the infection, such as skin rash and red eyes. The various means of prevention of COVID-19

transmission in the dental clinic were also well known by respondents, apart from the removal of books and toys from the clinic waiting room which was recommended by only a few of the respondents. In addition, the respondents had a good knowledge of the appropriate PPE to be used for both aerosol and non-aerosol-generating orthodontic procedures in the dental clinic.

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The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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