

Awareness of COVID-19 and the Dental Implications of its Oral Manifestations among Dental Health Practitioners in Nigeria

*Mercy Okoh¹, Nonso Onyia², Dickson Sopuruchukwu Okoh², Aderonke Adebawun Abah³, Uwaila Otakhoigbogie⁴, Happy Adeyinka Adedapo⁵, Elijah Olufemi Oyetola⁶, Ekhosuehi Theophilus Agho⁷, Foluso John Owotade⁶.

¹Department of Oral and Maxillofacial Pathology and Medicine, School of Dentistry, University of Benin, Nigeria. ²Department Oral Pathology and Medicine, University of Benin Teaching Hospital, Benin, Nigeria. ³Department of Oral Pathology and Oral Medicine, Faculty of Dentistry, Lagos State University College of Medicine, Lagos, Nigeria. ⁴Department of Oral Pathology and Oral Medicine, University of Nigeria, Enugu Campus, Enugu, Nigeria. ⁵Department of Oral Pathology and Oral Medicine, University College Hospital, Ibadan, Nigeria. ⁶Department of Oral Pathology and Oral Medicine, Obafemi Awolowo University, Ile-Ife, Nigeria. ⁷Department of Dental Surgery, Ahmadu Bello University, Zaria, Nigeria.

Abstract

Background There are many aspects of COVID-19 that are related to dental practice. Hence, this study aimed to assess the level of awareness of COVID-19 concerning its symptoms, transmission and prevention and the dental implications of its oral manifestations among dentists in Nigeria.

Methodology: This is a cross-sectional study that sampled dentists who work in Nigeria regardless of their place of work with an online questionnaire using Google forms to collect the data. The questionnaire was anonymous to maintain the privacy and confidentiality of all information collected in the study. The survey was a structured questionnaire divided into three sections: Dentists' demographics, knowledge of the disease and dental implications of COVID-19.

Results: This study included 206 dentists practising in Nigeria, with 126 (61.2%) males and 80 (38.8%) females. A total of 191 (92.7%) dentists perceived COVID-19 as highly contagious and deadly. Almost all the participants (n=205, 99.5%) were knowledgeable about the mode of transmission of the disease through respiratory droplets. A total of 204 (99.0%) affirmed that dental practitioners were at risk of becoming infected with COVID-19. About 84.5% reported that salivary glands can serve as a potential reservoir for COVID-19.

Conclusion: The awareness of COVID-19 concerning the mode of transmission, symptoms and prevention among the dental professionals was encouraging. This would lead to enhanced infection control in dental settings. The majority of the participants reported that saliva can be used as a promising non-invasive specimen for diagnosis, monitoring and infection control in patients with COVID-19.

Keywords: Knowledge; Dental Implication - Knowledge; Dental Implication.

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) in Wuhan, China, has evolved rapidly into a public health crisis,^[1] and has spread exponentially to other parts of the world.^[2] While the responsible virus was recognized as a coronavirus and initially referred to as

Corresponding Author: *Mercy Okoh
Department of Oral and Maxillofacial Pathology and
Medicine, School of Dentistry, College of Medical
Sciences, University of Benin, Benin, Nigeria.
mercy.okoh@uniben.edu

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the Wuhan Virus or 2019 novel Coronavirus (2019-nCoV), further genetic studies revealed that it was a severe acute respiratory syndrome-like (SARS-like) virus, and the International Committee on Taxonomy of Viruses has now named it SARS-CoV-2 and the disease complex caused by the virus as COVID-19.^[3]

^[4]The mode of transmission of the SARS-CoV-2 virus is via respiratory droplets, but transmission is also possible through other routes as the virus has been recovered in blood and stool. Clinical manifestations include fever, dry cough, fatigue, myalgia, headache, sore throat, abdominal pain and diarrhoea.^{[5],[6]}

The asymptomatic incubation period of the virus is estimated to be between 2 and 12 days; however, some studies have reported up to 24 days incubation period.

^[7] Consequently, patients infected with COVID-19, without showing symptoms, are a great threat to dentists and other members of the dental team. Dentists, thereby, should entertain a high level of awareness and integrity to deal with the disease and be able to control and manage its spread.

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, exposure to saliva, exposure to blood and proximity of the provider to the patient's oropharyngeal region. In addition, if adequate precautions are not taken, the dental office can potentially expose patients to cross-contamination.^{[8],[9],[10],[11]}

There are many aspects of COVID-19 that are related to dental practice in addition to infection control, including prevention and treatment. Similarly, there are clinical manifestations that affect the orofacial region that dentists should be familiar with ^[12]to improve their knowledge and prevention practices so they could contribute to COVID-19 control and prevention at a population level. It is of utmost importance, therefore, to assess awareness of the potential risks of COVID-19 among dental healthcare providers, and implement sound prevention measures in dental clinics. Hence, this study aimed to assess the awareness of COVID-19 concerning its symptoms, transmission and prevention, and the dental implications of its oral manifestations among dental healthcare providers in Nigeria.

Methods and Material

Study population

We sampled dentists who work in Nigeria regardless of their place of work either in private clinics, Government hospitals, or health centres from May to June 2020. An online questionnaire using Google forms was used to collect the data. The questionnaire was anonymous to maintain the privacy and confidentiality of all information collected in the study. Both convenience sampling (researchers themselves contacting dentists to participate in the study) and snowball sampling (the participating dentists were asked to forward the questionnaire to their colleagues) were used so that maximal participation could be ensured. A convenient sample size of 200 participants was used in this study.

Study Instrument

Questions of the survey were developed after reviewing relevant literature and the international guidelines on COVID-19.^{[1],[10],[11],[13],[15]} The questionnaire was designed in English and comprised a series of questions on socio-demographic characteristics, knowledge of dentists of symptoms, incubation period, transmission, and infection control measures for preventing COVID-19, their knowledge of oral manifestations of COVID-19 and the implications in dental clinics. The survey was a structured questionnaire divided into three sections: Dentists' demographics, knowledge of the disease and dental implications of COVID-19. The questionnaire was pretested to make it conform to the aims and objectives of the study. There was a note added to the online questionnaire stating that the survey was only for dentists in Nigeria.

Statistical analysis

Statistical analysis was done using Statistical Package of Social Sciences (SPSS 21) software. Frequency and percentages were used to describe the socio-demographic characteristics. Ethical approval for the study was given by the Ethics and Research Committee, University of Benin Teaching Hospital (ADM/E22/A/VOL. V11/1483069).

Results

Socio-demographic characteristics of the participating dentists

This study included 206 dentists practicing in Nigeria, with 126 (61.2%) males and 80 (38.8%) females. Most of the participants were in the 31 to 40 years age group (n=69, 33.5%). Majority were in the public sector (n = 157, 76.2%), and a practicing period of 11

to 20 years was mostly reported (n=65, 31.6%). A total of 60 (29.1%) were consultants, followed by dental officers (n= 51, 24.8%) and registrars (n=36, 17.5%). General dental practitioners (n= 52, 25.2%) and oral surgeons (n=31, 15.0%) made up the majority of the specialties (Table 1).

Knowledge regarding COVID-19

A total of 191 (92.7%) dentists perceived COVID-19 as highly contagious and deadly. Almost all the participants (n=205, 99.5%) were knowledgeable about the mode of transmission of the disease through respiratory droplets. About 99.6% (n=199) of the participants were not sure of having a vaccine for the prevention of COVID-19. A total of 99.5% affirmed that asymptomatic patients can transmit the disease. Concerning the incubation period, 94.7% (n=195) reported 5 to 14 days. All the participants (n=206, 100.0%), reported that hand hygiene, isolation, social distancing and the use of face masks can help prevent the spread of the disease. (Table 2).

Ninety-eight per cent (n=202) stated fever, dry cough and difficulty breathing as the major signs of the disease. Less than 50% upheld vomiting (43.2%), abdominal pain (49.0%) and skin rash (24.8%) as symptoms of COVID-19. The majority reported that patients with chronic lung disease (n=205, 99.5%), older patients above 65 years (n= 204, 99.0%), diabetic patients (n=200, 97.1%) and cancer chemotherapy patients (n=196, 95.1%) were at higher risk of severe illness from COVID-19. The percentage of dentists who reported other symptoms and high-risk groups is shown in Table 3.

Dental implications of COVID-19

A total of 204 (99.0%) affirmed that dental practitioners were at risk of becoming infected with COVID-19, and more than half (n=119, 57.8%) of the participants were not sure of the possibility of social distancing in dentistry. About 84.5% reported that salivary glands can serve as a potential reservoir for COVID-19, and 87.9% (n=181) indicated that COVID-19 is present in the saliva of infected patients. Taste dysfunction was identified by 83.5%(n=173) as a symptom of the disease. Seventy-nine per cent (n=163) stated that only emergency treatment in the dental clinic should be performed during the pandemic (Table 4).

Concerning the awareness of the measures for preventing COVID-19 in dental clinics, all the participants (n= 206) reported that frequently cleaning

the hands with alcohol-based hand rub or soap and water was effective in preventing the disease. The majority of dentists stated that the use of personal protective equipment (n= 203, 98.5%), routine cleaning and disinfection of surfaces (n=199, 96.6%) and not touching your face (n=198, 96.1%) would help prevent the spread of COVID-19 in dental settings (Table 5).

Table 1: Demographic characteristics of participants

Characteristics	Frequency(n= 206)	Percentage
Age Grade (Years)		
21-30	52	25.2
31-40	69	33.5
41-50	51	24.8
51-60	23	11.2
61-70	10	4.9
>70	1	0.5
Gender		
Male	126	61.2
Female	80	38.8
Marital Status		
Single	58	28.2
Married	141	68.4
Divorced	4	1.9
Widowed	3	1.5
Rank		
House Officer	17	8.3
Dental Officer	51	24.8
Registrar	36	17.5
Senior Registrar	35	17.0
Consultant	60	29.1
Employment Status		
Public	157	76.2
Private	27	13.1
Unemployment	15	7.3
Other	7	3.4
Practice Years		
< 5	56	27.2
5-10	41	19.9
11-20	65	31.6
>20	38	18.4
Speciality		
Oral Surgery	31	15.0
Oral Pathology	10	4.9
Oral Medicine	12	5.8
Conservative Dentistry	11	5.3
Prosthetic Dentistry	6	2.9
Periodontics	22	10.7
Paedodontics	10	4.9
Orthodontics	11	5.3
Community Dentistry	6	2.9
Family Dentistry	16	7.8
General Dental Practice	52	25.2
Other	19	9.2

Table 2: Dentists' knowledge of incubation period, mode of transmission and prevention of COVID-19

Variable	Yes (%)	No (%)	Not sure (%)
The spread of COVID-19 is through respiratory droplets of infected persons	205 (99.5)	1 (0.5)	0 (0.0)
COVID-19 is highly contagious and deadly	191 (92.7)	11 (5.3)	4 (1.9)
The epidemiological pattern of COVID-19 suggests an incubation period of 5-14 days	195 (94.7)	8 (3.9)	3 (1.5)
Asymptomatic people despite having COVID-19 can spread the disease	205 (99.5)	1 (0.5)	0 (0.0)
Hand hygiene/hand cleaning is important in the control of the spread of the COVID-19 outbreak	206 (100.0)	0 (0.0)	0 (0.0)
Isolation, social distancing and use of face masks help prevent the spread of the disease	206 (100.0)	0 (0.0)	0 (0.0)
Is there a Vaccine for the prevention of COVID-19?	0 (0.0)	6 (2.9)	199 (96.6)
There currently is no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover.	203 (98.5)	2 (1.0)	1 (0.5)

Table 3: Knowledge of the symptoms and high-risk groups to COVID-19 among Dentists

Variable	Frequency (n= 206)	Percentage (%)
The main clinical symptoms of COVID-19 are		
Fever	202	98.1
Dry cough	202	98.1
Fatigue	159	77.2
Sore throat	181	87.9
Difficulty breathing	202	98.1
Other symptoms of COVID-19 are		
Myalgia	146	70.9
Headache	170	82.5
Anosmia	136	66.3
Diarrhoea	137	66.5
Abdominal pain	101	49.0
Vomiting	89	43.2
Skin rash	51	24.8
Discolouration of fingers	44	21.4
Those that might be at higher risk of severe illness from COVID-19 are people with		
Chronic lung disease	201	97.6
Diabetes	200	97.1
Heart disease	185	89.8
Liver disease	165	80.1
Obesity	140	68.0
Cancer chemotherapy patients	196	95.1
Older patients above 65 years	204	99.0
Pregnant women	130	63.1

Table 4: Dental Implications of COVID-19

Variables	Yes (%)	No (%)	Not Sure (%)
Is there an opportunity for social distancing in Dentistry since our work involves being inches away from patients' open mouths?	61 (29.6)	25 (12.1)	119 (57.8)
The risk of a dental practitioner becoming infected from treating COVID-19 patients is high	204 (99.0)	0 (0.0)	2 (1.0)
Salivary glands can serve as potential reservoirs for COVID-19 asymptomatic infection?	174 (84.5)	29 (14.1)	1 (0.5)
COVID-19 present in salivary secretions of affected patients?	181 (87.9)	23 (11.2)	2 (1.0)
Saliva is a promising non-invasive specimen for diagnosis, monitoring and infection control in patients with COVID-19	180 (87.4)	23 (11.2)	3 (1.5)
Ageusia (loss of taste) and dysgeusia (abnormal taste sensation) are symptoms of COVID-19	172 (83.5)	22 (10.7)	12 (5.8)
Burning mouth is a symptom of COVID-19	27 (13.1)	116 (56.3)	63 (30.6)

Readily available dental mouthwashes have the potential to destroy the lipid envelope of COVID-19	91 (44.2)	85 (41.3)	28 (13.6)
Regular tooth brushing can help to prevent COVID-19 transmission	94 (45.6)	55 (26.7)	56 (27.2)
Potential for healthcare transmission of COVID-19 in dental clinics especially in aerosol-generating procedure	203 (98.5)	2 (1.0)	0 (0.0)
Dental practitioners should perform only emergency treatments during the COVID-19 pandemic	163 (79.1)	12 (5.8)	31 (15.0)

Table 5: Awareness of Preventive measures for COVID-19 in Dental Settings

Variable	Frequency (n= 206)	Percentage (%)
Frequently clean hands by using alcohol-based hand rub or soap and water	206	100.0
Routinely clean and disinfect surfaces in contact with known or suspected patients	197	96.6
Put a face mask on known or suspected patients	179	86.9
Use of personal protective equipment such as gowns, gloves, dental goggles or face shield	203	98.5
All health staff members wear protective clothing	192	93.2
Place known or suspected patients inadequately ventilated single rooms	177	85.9
Not touching your face	198	96.1

Discussion

This study which surveyed the general awareness of COVID-19 among dental surgeons in Nigeria and the dental implications of the disease had more male dentists participating with a majority in the general dental practice. This may be reflective of the population of dentists in Nigeria which is male-dominated.^[16]

COVID 19 is a highly contagious and deadly disease that mainly spread through the respiratory droplets of infected persons.^[13] Most of the respondent from this study agrees with the above. The mode of transmission of the SARS-CoV-2 virus is via respiratory droplets.^{[4], [5], [6]} This was affirmed by 99.5% of dentists in this study. More so, 100% of the respondents agreed that hand hygiene/ hand cleaning, isolation, social distancing and use of facemask help in preventing the spread of COVID-19 in line with the Centre for Disease Control and World Health Organization (WHO) policies.^{[1],[13]}

Almost all of the respondents agreed that asymptomatic people can spread the disease, this is in agreement with a study in the Republic of Korea which showed that the viral load was the same in both symptomatic and asymptomatic patients.^[17] Although, a subset of studies and data shared by some countries

on detailed cluster investigations and contact tracing activities have reported that asymptotically-infected individuals are much less likely to transmit the virus than those who develop symptoms.^[13]

About 98.5 % of the participants maintained there is currently no effective cure for COVID-19, but early symptomatic and supportive treatment can help most patients recover. According to WHO, there has been no evidence-based specific treatment for COVID-19, and management of COVID-19 has been largely supportive.^{[11],[13]}

Studies have shown the presence of SARS-CoV-2 in both saliva and faeces of the affected patients.^{[11],[12],[13]}

It is known that SARS-CoV-2 can bind to human angiotensin-converting enzyme 2 (ACE-2) receptors, which are highly concentrated in salivary glands; this may be a possible explanation for the presence of SARS-CoV-2 in secretory saliva.^{[12],[14]} Saliva is a promising noninvasive specimen for diagnosis, monitoring, and infection control in patients with 2019-nCoV infection as asserted by 87.4% of the dentists in the present study. Because saliva can be provided by patients without any invasive procedures, is ideal for situations in which nasopharyngeal specimen collection may be contraindicated.^[11]

Altered taste sensation has been recognized lately as one of the symptoms of COVID-19 in several studies among patients with the disease.^{[4],[5],[18]} It could be in the form of loss of taste (ageusia) or altered taste sensation (dysgeusia). This was agreed by 83.5% in the present study. In a previous study,^[18] sixty-seven patients (52%) reported changes in taste sensation. Dentists should be aware of this symptom since they may encounter patients with taste abnormalities in the form of dysgeusia or burning mouth syndrome. Self-reported loss of taste and smell is a much stronger predictor of a positive COVID-19 diagnosis than self-reported fever.^{[19],[20]}

Patients with SARS-CoV-2 commonly presents with common cold or flu-like (influenza) symptoms such as fever, dry cough, fatigue.^{[21],[22],[23],[24]} This study demonstrated adequate awareness of the main symptoms of COVID-19 by the participants, which is according to the study by Kamate SK et al.^[25] Although, their awareness of other symptoms such as vomiting, diarrhoea, skin rash and abdominal pain as reported by other studies,^{[26],[27],[28],[29],[30],[31],[32]} was not encouraging. This could be because they are not the common symptoms of COVID-19.

It's been shown that there are some risk factors associated with COVID-19 which is allied to low immunity. These include chronic lung disease, diabetes mellitus, heart disease, liver disease, obesity, cancer and older patients (65 years and older). Pregnant women are another set of individuals that are at risk and more prone to COVID-19 infection because they are susceptible to respiratory microorganisms and pneumonia.^{[31],[32],[33],[34]} The dentists in the present study were knowledgeable of such.

This study revealed that all the subjects have adequate awareness about frequent cleaning of hands using alcohol-based hand rubs or soaps and water as a preventive measure against the novel virus. This outcome is similar to the results reported by Khader et al., in their study on the Jordanian dentists where most of the participants were aware of questions related to the mode of disease transmission and WHO guidelines regarding hand hygiene.^[11]

On knowing whether routinely cleaned and disinfected surfaces in contact with known or suspected patients prevent the transmission of the Coronavirus, 96.6% of the study population were conversant with the need to implement this measure. This shows that the majority of the study population are in tune with the position of the Centre for Disease Control which states that emphasis for cleaning and disinfection should be placed on surfaces that are most likely to become contaminated with pathogens, including clinical contact surfaces (e.g., frequently touched surfaces such as light handles, bracket trays, switches on dental units, computer equipment) in the patient-care area since the virus can persist on surfaces for a few hours or up to several days, depending on the type of surface, the temperature, or the humidity of the environment.^{[35],[36],[37],[38]} This also agrees with Marwaha and Shah, who expressed that routine cleaning and disinfection strategies should be followed in dental offices.^[39]

This study also showed that the majority of the participants know the importance of putting face masks on known or suspected patients. This tallies with one of the findings in a study carried out in India stating that all patients were required to wear face masks in the hospital.^[40] This information is crucial as not knowing about this may lead to inadvertent transmission of infection from patients to patients or from patients to their caregivers.

The dental clinic could be a high-risk environment for spreading the virus because of the close contact with patients and the nature of the dental treatment. This statement was collaborated by 99.0% of the participants who believed that the risk of a dental practitioner becoming infected from treating a COVID-19 patient is high. Although patients diagnosed with COVID-19 are not supposed to receive dental treatments, dental emergencies can occur during the pandemic thereby making close contact unavoidable.^{[4], [10]} This was supported by 79.0% in the present study that only emergency treatment in the dental clinic should be performed. Therefore, dentists should take strict personal protection measures and avoid or minimize operations that can produce droplets or aerosols during the pandemic. Whereas the suspension of non-emergency dental treatment while providing emergency dental services only has been recommended,^[10] it would be better to improve infection prevention and control (IPC) practice rather than disrupt important dental services.

There are practical guidelines recommended to dentists and dental staff by the Center for Disease Control and Prevention (CDC), the American Dental Association (ADA) and the World Health Organization (WHO) to control the spread of COVID-19.^{[12],[13],[14]} These guidelines should be strictly adhered to for the safety of both the dentists and the patients.

It is recommended that practising dentists should ensure that all members of the oral healthcare team are well acquainted with COVID-19 transmission and preventive measures. Provision of dental services should take into consideration the availability of personal protective equipment. Dentists should remain updated as more information emerges on the disease.

The limitation of this study is as a result of the method of data collection which was collected online through self-reported questionnaires, because during the study there was a total lockdown in the country of study due to COVID-19, hence the numbers of the respondents were limited

Conclusively, the awareness of COVID-19 concerning the mode of transmission, symptoms and prevention among the dental professionals was encouraging. This would lead to enhanced infection control in dental settings. Many believed that only dental emergencies should be provided during the

pandemic probably because of the nature of the dental treatment. Most of the participants suggested that saliva can be used as a promising non-invasive specimen for diagnosis, monitoring and infection control in patients with COVID-19.

We recommend that practising dentists should ensure that all members of the oral healthcare team are well acquainted with COVID-19 transmission and preventive measures. Provision of dental services should take into consideration the availability of PPE. Dentists should remain updated as more information emerges on the disease. Although the suspension of non-emergency dental treatment while providing emergency dental services only has been recommended, it would be better to improve infection prevention and control (IPC) practice rather than disrupt important dental services.

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Competing interest

The authors declare no competing interest. And there was no external source of funding.

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