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Assessment of patients' knowledge, attitude and practice of cross-infection control in the dental clinic during COVID-19 pandemic

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Abstract

Background: The emergence of coronavirus disease 2019 (COVID-19), a highly contagious disease that causes viral respiratory illness, has changed the lifestyle of humans worldwide. Dental practitioners and patients are at high risk of infection during their routine practice due to their exposure to saliva, blood, and droplet production.
Aim: To gain insight into the patient's viewpoint regarding the practice, altitude, and knowledge of COVID-19 and its transmission and cross-infection in dental clinics.
Methods: This was cross–sectional analytic survey in dentistry during the COVID-19 pandemic. A self-administered close-ended questionnaire consisting of 32 variables was distributed among the study participants. The data were analysed using the Statistical Package for the Social Sciences (SPSS) version 25. The level of significance was $p \leq 0.05$.
Results: The age of the participants varied from 20 - 58 years, with a mean age of 34.6 ±5. The majority (89.3%) felt COVID-19 was a highly contagious disease, while 50.0% of the respondents believed that the most common route of COVID-19 transmission in dentistry is through aerosols. The majority, 78.6%, recorded good knowledge of infection control following the COVID-19 outbreak. The number of married patients who had good knowledge of cross-infection control was 118, which was statistically significant.
Conclusion: From the study, it is evident that the patients possess a good range of knowledge in both preventive and cross-infection protocols to follow during the COVID-19 pandemic. However, the same cannot be said about the practice

Keywords: Assessment, Knowledge, Attitude, Practice, Cross-infection, COVID-19, Pandemic

Introduction

The emergence of coronavirus disease 2019 (COVID-19), a highly contagious disease that causes viral respiratory illness, has changed the lifestyle of humans worldwide.[1] In December 2019, a viral pneumonia outbreak caused by an unknown coronavirus was reported in Wuhan, China. SARS-CoV-2 (severe acute respiratory syndrome coronavirus) causes the disease and has become a major public health issue.[1,2] The World Health Organization (WHO) declared the disease a public health emergency of international concern on January 30th, 2020 and named it coronavirus disease 2019 (COVID-19) on February 11th, 2020.[3]

Dental treatment has shown potential risks of SARS-CoV-2 infection, both for professionals and patients, mainly because dental treatment involves several bioaerosol-generating procedures.[4] Accordingly, dentistry has been identified as one of the professions with the highest risk of exposure to

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COVID-19, requiring specific biosafety protocols and individual assessment of the patient's clinical status.[5,6]

Dental practitioners and patients are at high risk of infection during their routine practice due to their exposure to saliva, blood, and droplet production.7 Therefore, during dental procedures, the transmission of SARS-CoV-2 can occur from infected individuals through the inhalation of their aerosols/droplets or directly through contact with oral fluids, mucous membranes, and contaminated instruments and surfaces.[6,7] Infection control in dentistry should aim to prevent the spread of disease-causing bacteria, viruses, and fungi between patients or from patients to dental staff.[8] To reduce the danger of transmission to dental healthcare workers and professionals and to offer the best possible care for patients, cross-infection control should be prioritized.

Few recent studies have evaluated the practices, altitude and knowledge regarding the COVID-19 outbreak among Nigerian and other African populations.[9] However, it is pertinent to evaluate the patient's practices, altitude and knowledge of cross-infection control in dentistry during COVID-19. The present study aims to gain insight into the patients' viewpoint regarding the practice, altitude and knowledge of COVID-19, and its transmission and cross-infection in dental clinics.

Materials and methods

A cross–sectional analytic survey was conducted from September to November 2022 to evaluate patients' knowledge, attitudes, and practices of cross-infection control in dentistry during the COVID-19 pandemic. The data were collected in the Dental Clinic of the University of Benin Teaching Hospital, Benin City, Edo state, which serves as a tertiary center in the south-south zone in Nigeria. All adult patients who presented to the oral diagnosis departments were included in the study. The participants were aware of the study's aim and were informed that participation was voluntary and that the data would be confidential. Verbal consent was obtained before data collection. The patients were informed that the data would be anonymous and that the information was for scientific research only.

The sample size was calculated using $n= z^2 pq d^2$, n= required sample size z= standard normal deviate p = 26%, which is the prevalence of adults who have attended dental clinics in Benin City within the past 12 months q =1-p = 0.78% N=1.962 x 0.26 x 0.78 0.05ˆ2 N= 295.6 approx. 296. However, the sample size in this study was set at 300.

A self-administered and interviewer's (for those who can not read and write) close-ended questionnaire consisting of 32 variables was distributed among the study participants. The first section comprisses questions on sociodemographic details. The second section comprises questions on the knowledge of COVID-19, its transmission, and cross-infection control in dental clinics, while the third section comprises questions on the attitude of patients toward cross-infection control as regards COVID-19 in the dental setting. The last section consists of questions on the cross-infection practice measures by patients. Points were assigned to each correct response, e.g., knowledge of COVID-19 consisting of 9 questions, which were graded as Poor (0-3 points), Average (4-6 points), and Good (7-9 points). The questions on the practice of patients towards cross-infection control were 6 and graded as Poor (0-2 Points), Fair (3-4 Points) and Good (5-6 Points), while those on of patients towards cross-infection control as regards COVID-19 in dentistry were 9 and graded as Poor (0-3 Points), Fair (4-5 Points) and Good (6-9 Points). The responses to specific questions on knowledge of cross-infection control were dichotomized into 'Yes, No or I don't know', while Likert's 5-point scale was used for registration of participant's responses on practice and altitude. The data collected were tabulated and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25. Descriptive statistics were used to obtain the frequency and percentage of independent and dependent variables. The Pearson test was used to compute the correlation between knowledge and attitude, knowledge and practice, and attitude and practice. For all comparative analyses, the level of significance was $p \leq 0.05$.

Results

A total of 300 participants were included in the study. The age of the participants varied from 20 - 58 years, with a mean age of 34.6 ±5. The majority 133 (44.3%) of the respondents were within the age

Table 1: Sociodemographic information of the participants

Variable	Frequency	Percentage (%)
Age (Years)		
20-30	133	44.3
31-40	81	27.0
41-50	55	18.3
51-60	31	10.3
Gender		
Male	129	43.0
Female	171	57.0
Marital status		
Single	149	49.7
Married	143	47.7
Widow	8	2.7
Education		
Primary	17	5.7
Secondary	65	21.7
Tertiary	218	72.7
Religion		
Christian	292	97.3
Muslim	8	2.7

Table 2: Participants' responses on the knowledge of cross-infection control in dentistry during COVID-19

Questions	Yes	No	I don't Know
Is COVID-19 a highly contagious disease?	268(89.3)	11(3.7)	21(7.0)
Common route of COVID-19 transmission in dentistry is through aerosol (water droplets) generated during dental procedures	146(50.0)	13(4.5)	133(45.5)
Daily screening of staff, dental assistants, dentists and patients is necessary	228(76.0)	12(4.0)	(6020.0)
Sterilization of instruments and disinfection of dental operatory is mandatory	268(90.2)	0(0.0)	(29(9.8)
Extraoral suction or cross ventilation could control aerosol (water droplets) spread.	141(47.6)	8(2.7)	147(49.6)
Hand gloves. face mask and protective clothing are necessary for the dentist	286(95.3)	3(1.0)	11(3.7)
Proper disposal of waste is of utmost importance for cross-infection control.	275(92.9)	3(1.0)	18(6.1)
Dentists and dental assistants should discard worn facemasks, gloves, and protective clothing after every patient.	269(89.7)	16(5.3)	15(5.0)
Dental chairs and accessories should be disinfected after every patient.	272(90.7)	12(4.0)	16(5.3)

group of 20-30 years. A high percentage of the participants were females (57%), while those with a tertiary level of education were the majority (72.7%), and 49.7% of the participants were single. Almost all the participants (approximately 97.3%) were Christians. (Table 1)

Table 2 represents the patients' responses to questions on knowledge. The majority (89.3%) felt COVID-19 was a highly contagious disease, while 50.0% of the respondents believed that the most common route of COVID-19 transmission in dentistry is through aerosols (water droplets) generated during dental procedures. More than two-thirds (76.0%) knew that daily screening of staff, dental assistants, dentists, and patients is necessary. Almost all the participants, constituting approximately 90.2%, agreed that the sterilization of instruments and disinfection of the dental operatory was mandatory. Approximately 49.6% of the participants did not know that extraoral suction or cross-ventilation could control the spread of aerosols. A very high percentage (95.3) of the respondents agreed that hand gloves, face masks, and protective clothing are necessary for dentists, while approximately 92.9% agreed that proper disposal of waste is of utmost importance for cross-infection control. A majority, 89.7%, agreed that dentists and dental assistants should discard worn face masks, gloves, and protective clothing after every patient, while almost all the respondents constituting approximately 90.7% agreed that dental chairs and accessories should be disinfected after every patient use. (Table 2)

Fig 1 depicts the knowledge grades as recorded in the study. The majority, 78.6%, recorded good knowledge of infection control following the COVID-19 outbreak.

Table 3 shows the relationship between the sociodemographic characteristics of the patients and their knowledge grades. There was a statistically significant association between the marital status of the respondents and the knowledge

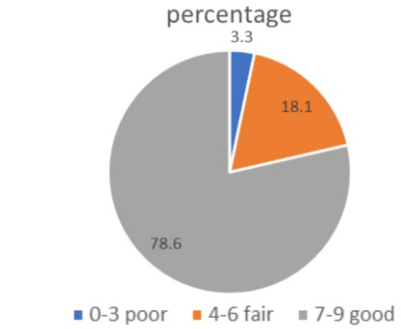

Fig 1 Grading of knowledge

Table 3: Association between the sociodemographic characteristics of patients and knowledge grading

	Knowledge grade			TOTAL	
	0-3(poor)	4-6(fair)	7-9(good)	Total	p value
Gender					
Male	4	31	94	129	
Female	6	23	141	170	0.067
Marital status					
Single	1.0(3	12.4(37	36.5(109	149	
Married	72.34(	5.7(17	39.5(118	142	
Widow	0	0	8	8	0.010*
Occupation					
Employed	1	16	112	129	
Unemployed	3	10	31	44	
Others	6	28	91	125	0.018*
Religion					
Christian	10	51	230	291	
Muslim	0	3	5	8	0.341
Education					
Primary	0	0	10	10	
Secondary	6	13	46	65	
Tertiary	4	41	172	217	
Others	0	0	4	4	0.055
Total	10	54	235	299	

Table 4: Patients' responses to questions on altitude towards cross-infection control in the COVID-19 era

Questions	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
Dentists should be given COVID-19 vaccines	25.3	51.0	20.8	1.4	1.4
Dentist should always wear gloves while patients are being treated	24.3	59.9	1.0	7.9	6.8
Upon receiving calls on phone, dentists should change gloves	29.0	45.7	16.7	3.3	5.3
Dentist may use the same gloves on more than one patient	6.8	7.9	1.0	59.9	24.3
When treating patients, dentists should always wear face mask	56.3	38.3	0.0	4.0	1.3
Often, dentists should be using a new set of gloves during long treatment	50.0	47.0	3.0	0.0	0.0
When handling patients. dentists should wear a face shield	30.3	49.0	15.3	0.0	5.3
The patient's waiting area should be marked with a social distancing sign	32.3	49.7	10.7	1.3	6.0
Dentists should keep and update records of daily staff and patient screening for COVID-19	37.7	42.7	18.3	0.00	1.3

of cross-infection.(p-value=0.01) This was statistically significant with a p-value of 0.010. There was also a strong association (p-0.018) between occupation and knowledge grade, with the highest number 112(47.9%) of employed patients having good knowledge of infection control.

Table 4 depicts the findings on respondents' attitudes towards cross-infection control. Only 25.3% of the participants strongly agreed that dentists should be given COVID-19 vaccines, while approximately 24.3% strongly agreed that dentists should always wear gloves while patients are being treated. Only a few, 29.0%, strongly agreed that upon receiving calls on the phone, dentists should change gloves, a good number, 59.9% strongly disagreed that dentists may use the same gloves on more than one patient, and more than half (56.3%) of the respondents strongly agreed that dentists should always wear a face mask when treating patients. Exactly half of the respondents strongly agreed that dentists should often make use of a new set of gloves during long treatment.

Table 5 shows patients' practices of cross-infection control. With regards to the responses on the practice of the patients towards cross-infection control in COVID-19, approximately one-third of the respondents, 32.0%, 35.0% and 36.5%, strongly agreed that patients should ask the dentist

Table 5: Patients' responses to questions on practice towards cross-infection control in the COVID-19 era

Questions	Strongly Agree	Agree	Neutral	Strongly Disagree	Disagree
I should ask the dentist how the equipment is being sterilized	32.0	49.3	15.0	0.00	3.7
I should ask to point it out to the dentist if they don't wear a face mask	35.0	48.7	14.0	1.0	1.3
I should ask to point it out to the dentist if they don't wear gloves	36.5	54.4	6.8	0.00	2.4
The dentist should be asked, how they are screening dental staff and patients for COVID-19	15.7	35.0	43.3	1.7	4.3
The dentist should be asked about the waste disposal protocols	14.7	39.0	36.7	3.3	6.3
The dentist should be asked about the management of patient appointments to avoid crowding	27.7	40.0	23.3	0.3	8.7

how the equipment is being sterilized, point it out to the dentist if they don't wear a face mask, and if they don't wear gloves, respectively. A very low number of the respondents, 15.7%, strongly agreed that dentists should be asked how they are screening dental staff and patients for COVID-19, while approximately 14.7% and 27.7% strongly agreed that dentists should be asked about waste disposal protocols and management of patient appointments to avoid crowding, respectively

Discussion

Prevention of cross-infection in the hospital environment is generally a key practice in infection control. Dental clinics are not exempt from this practice. This practice is expected to be intensified during a disease outbreak.[10,11] The task of preventing cross-infection in the dental office is that of both the patient and the dental practitioner.[12]

The present study recorded good knowledge of cross-infection control during the COVID-19 outbreak by the majority of the respondents. However, it was observed that more females had good knowledge, and patients with tertiary levels of education showed better knowledge than those with primary and secondary levels of education. This finding can be ascribed to the fact that females tend to pay more attention to their health and seek more information about health and that the tertiary level of education may have contributed more to the knowledge of the respondents on cross-infection control. It is therefore important to teach more about infection control at both primary and secondary levels of education. It is interesting to note that being single or married or being employed or unemployed did not affect the knowledge of the respondents about cross-infection control, as our study found a statistically significant association between marital status (p-0.010), occupation (p-0.018), and knowledge of cross-infection control. Thillaikkarasi V et al[13] evaluated the knowledge, attitudes, and practice of dental patients attending Oman Dental College towards cross-infection control and reported poor knowledge among respondents in the student category and aged 18-30 years. The majority of the respondents in our study agreed that aerosol was the most common route of transmission of infection in the dental clinic. This is corroborated by a study carried out in Oman,[13] and it is in agreement with another study that also reported that most of the study participants were aware that aerosol was the most common route of cross-infections in the dental clinic. However, a study by Ahmed et al[10] reported a contrary finding. It is a possibility that more patients in our study are aware of aerosol as the most common route of cross-infection in the dental clinic because of the pandemic. Several people became more interested in the pandemic and clinical information about the pandemic, including the routes of spread during the COVID-19 outbreak in Nigeria. Droplet infections are known to be the most common route of viral spread, and dental aerosols play a vital role in the spread of COVID-19. Hence, appropriate measures are to be taken to avoid this. The use of rubber dams and high-volume suctions plays a major role in controlling aerosols.

Other aspects of the present study that were

evaluated include the sterilization status of the instrument used in the clinic and cross ventilation as a means of reducing aerosols. The study showed that the majority of the respondents were aware of the sterilization status of the dental clinic. This is at variance with the study conducted in Oman Dental College, which reported that the majority of respondents were unaware of the sterilization status of the clinic. However, there were more patients in our study who did not know that cross-ventilation could reduce aerosols in the dental clinic. This is consistent with a previous study.[13] Patients can be made to know more about cross ventilation in the clinic by sharing the right information through the use of handbills or pamphlets and banners. This will increase the patient's confidence and trust in the dental clinic.

In this study, female respondents showed a better attitude toward cross-infection. We observed a very strong association between gender and certain questions reflecting the attitudes of the respondents towards cross-infection control. The questions on whether dentists should be vaccinated with the COVID-19 vaccine, whether dentists should wear gloves while treating patients upon receiving calls on a phone, whether dentists should change gloves, use gloves on more than one patient, dentists should always wear face masks when treating patients, dentists should ensure social distancing by patients, keeping daily records, and how equipment is sterilized all showed a strong association with gender. This shows that being a male or female does not necessarily influence the above questions. In a study conducted by Thillaikkarasi V et al[13], male respondents had better attitudes toward cross-infection control despite having more female respondents. Another study reported a contrary finding.[6] They recorded more females with a better attitude. This is consistent with the findings of this study.

The present study was carried out in a dental facility in south-south Nigeria to assess patients' knowledge and practice of cross-infection control. In our study, there were more female participants than males. This is similar to a study conducted in Omar.[13] This may not be unconnected with the fact that females are more interested in health matters. It was not surprising to find in our study that females had better knowledge. This is consistent with a study conducted previously in Jeddah[17] and in contrast to a previous study.[13] The reason for the higher knowledge among females in this study may be because there were more female participants and females are more interested in their health and therefore tend to seek more information concerning their health. The majority of the participants in the current study agreed that COVID-19 was highly contagious.

The overall knowledge score was good, with 78.6% of participants scoring good. However, there was a strong association between marital status (p-0.010), occupation (p-0.018), and knowledge grading. This shows that marital status and occupation significantly influence knowledge of cross-infection control. Although some previous studies did not report knowledge scores and grading, their findings are in agreement with the results of the present study, which reported high knowledge among respondents.[14,13] Participants with tertiary levels of education exhibited better knowledge in our study. This means that education plays an important role in the level of awareness of cross-infections and ways to control them. A few other studies have reported similar findings.

The respondents' attitudes towards cross-infection control were evaluated. Only approximately a quarter of the patients who participated in our study strongly agreed that dentists should be given COVID-19 vaccines, should wear hand gloves when seeing patients, and should change their hand gloves after receiving phone calls. Slightly more than half of the respondents strongly disagreed with dentists using the same hand gloves for more than one patient. Approximately the same proportion of the respondents strongly agreed that dentists should wear face masks. These findings are not encouraging. This may be because patients are not adequately informed on cross-infection control. Patients should always be educated on good infection control practices whenever they visit the dental clinic or any other health facility. The poor attitude reported in this study is worrisome, as one expects the level of consciousness of the patients regarding infection control to be high. It is, however, quite encouraging to know that a few patients have the right attitude toward infection control measures, as reported by our current study.

Conclusion

This study evaluated the patient's knowledge, attitude and practice toward cross-infection control. From the study, it is evident that the patients possess a good range of knowledge in preventive and cross-infection protocols during the COVID-19 pandemic. However, the same cannot be said about the practice.

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