

Original Research

Dental Care During the COVID-19 Pandemic: Patient Perceptions of Barriers to Dental Care, COVID-19 Safety Precautions, and Administration of the COVID-19 Vaccine at the Dental Office

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Abstract

Background

The Mountain Area Health Education Center (MAHEC) Dental Health Center sought to learn how COVID-19 affected dental care attainment and patient perceptions of appropriate safety measures, as well as their acceptance of the dental office as a site for COVID-19 vaccinations.

Methods

A cross-sectional online survey of dental patients was performed to inquire about barriers to care, safety precautions, including COVID-19 testing, and the acceptability of vaccination for COVID-19 in the dental office. All adult patients of the MAHEC Dental Health Center with an email address on file and a clinic visit in the past year were randomized for inclusion.

Results

We sampled 261 adult patients; the majority were White (83.1%), female (70.1%), and over 60 years of age (60.1%). Patients who were included had visited the clinic for routine cleanings (67.2%) and dental emergency care (77.4%) in the past year. Respondents supported safety precautions at the clinic; however, there was little support for mandatory COVID-19 testing prior to a visit (14.7%). Just under half (47.3%) of respondents believed it would be appropriate for a dental office to give COVID-19 vaccinations.

Conclusions

Overall, patients experienced concerns during the pandemic but still sought dental care for routine treatments and emergencies. Patients supported the use of precautionary COVID-19 safety measures at the clinic, though they did not support mandatory COVID-19 testing prior to a visit. Respondents were split on the acceptability of COVID-19 vaccination in the dental clinic.

Keywords

COVID-19; SARS-CoV-2 infection; mass vaccinations; dentistry; dental care; primary health care; professional role; dentist's role; infectious disease

Introduction

Studies conducted early in the pandemic (prior to June 2020) have reported avoidance of medical care due to the COVID-19 pandemic, with the Centers for Disease Control (CDC) estimating that over 40% of adults in the

United States (US) delayed or avoided care.¹ Disruption of dental care mirrors these findings, with one national study noting that 47% of adults delayed or avoided dental care due to the pandemic.² Deferring dental care leads to escalating dental health issues and worsening of oral and medical health.³

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While non-dental, medical care offices have implemented telehealth platforms for virtual appointments, there is not enough evidence to declare that adequate dental care is compatible with this service modality.⁴ The American Dental Association (ADA) and the CDC published guidelines to protect patients and the dental team from contracting COVID-19.^{5,6} These guidelines include implementing patient temperature checks, questioning patients on health status, wearing masks, maintaining social distance in waiting rooms, providing access to hand sanitizer, and providing personal protective equipment for dental staff, including masks and goggles or face shields. The ADA guidance also provides strategies for reducing aerosol production. Through the implementation of these safety precautions, patients and staff may feel less at risk at the dental office. Additionally, the ADA is in support of COVID-19 rapid testing for all dental patients immediately before treatment⁵; it is not known how receptive patients are to these recommendations.

An added consideration during the pandemic was access to COVID-19 vaccinations. Vaccines effective against COVID-19 were approved for emergency use by the federal government⁶ and there was a need to vaccinate large numbers in our population quickly. Dental professionals, who give injections to patients routinely and are educated in basic human science, clinical skills, medicine, and sterile techniques, may be an invaluable resource in this regard during the COVID-19 pandemic response.⁷

The dental clinic at Mountain Area Health Education Center (MAHEC), located in western North Carolina, implemented COVID-19 guidelines as outlined by the ADA and CDC. In the present study, we sought to better understand dental patients' perceptions of safety measures. This information can be used to shape care delivery approaches in the future. Specifically, we wanted to identify: 1) barriers to care that patients experienced during COVID-19; 2) patients' perceptions of appropriate patient/staff safety measures, including COVID-19 testing; and 3) patients' willingness to be vaccinated at the dental office. We anticipate this information will help dental professionals improve continuity in care for dental patients and appropriately shape public health measures.

Methods

Setting

The study setting was the MAHEC Dental Health Center, a safety net dental care provider, which also houses a general practice residency program. The Dental Health Center is located in Asheville, North Carolina, and provides state-of-the-art care with digital radiography, cone-beam computed tomography (CBCT), soft tissue laser, 3D printer, intraoral scanners, and telehealth capabilities. The Dental Health Center has 3 full-time faculty members, 7 medical residents, 3 dental hygienists, and 10 dental assistants; it offers comprehensive care that covers the spectrum of dental needs for western North Carolina dental patients. The clinic has a payor mix of Medicaid, Medicare, commercial insurance, and self-pay patients. The practice never closed for emergency care during the COVID-19 pandemic, but was closed from March 2020 to May 2020 for preventive and elective care.

Recruitment

We conducted a cross-sectional study by distributing online surveys to dental patients via email from November 2, 2020, to December 14, 2020. Inclusion criteria included patients 18 years and older with email addresses on file and at least 1 visit to the dental office between September 1, 2019, and August 30, 2020. The patient list was randomized and emails were sent to the first 1460 patients. Emails were sent weekly, in batches of 300-400 emails, until we reached or surpassed our target of 250 respondents. An initial invitation to the survey was sent out, a follow-up was sent 7 days later to those who did not respond, and they were given 4-5 additional days to respond. Patients were offered a \$10 gift card for responding to the survey, which has been shown to improve response rates and completeness.^{8,9} The study was deemed not human subjects research by the Mission Health Institutional Review Board (electronic approval on October 10, 2020). Informed consent was obtained from the participants in a statement at the beginning of the survey, which explained that participation was voluntary, and that the participant may exit the survey at any time.

Research Instrument

The survey was designed by the research team

in Qualtrics (Seattle, WA), a secure Health Insurance Portability and Accountability Act (HIPAA) compliant web application. The survey consisted of questions in 4 sections aligned with our specific aims: barriers to care, perceptions of safety precautions including testing, willingness to be vaccinated by a dentist, and demographics (**Appendix A**). To maximize both face and content validity, 2 subject matter experts in dental care and 3 researchers with expertise in survey methods reviewed the instrument to ensure it was appropriate, relevant, adequately measured the pre-identified concepts, and met the needs of decision-makers.¹⁰⁻¹⁴ We pilot-tested the survey with 4 dental patients and made revisions based on their feedback to ensure the questions were understandable. Specifically, a draft of the survey was sent to dental patients who were instructed to indicate all parts of the survey that were confusing, difficult, considered rude, difficult to answer honestly, or should be deleted. They were also asked to report how long it took them to complete the survey, any other suggestions for improvements, any questions they thought were missing, and whether the survey asked about important issues. A revised version

was developed based on the pilot test. The survey was then discussed with the pilot testing individuals; questions were answered and doubts were discussed.

Statistical Analysis

Descriptive statistics were computed using SPSS Statistics, Version 26 (IBM, Armonk, NY). Each set of open-ended responses was grouped into themes.

Results

A total of 261 MAHEC dental patients responded to the web-based survey from November 2, 2020 through December 30, 2020 (response rate: 18%). The median age range of responding patients was 60-64 years (range: 18-65 years old and older) (**Table 1**). Overall, most respondents identified as female (70.1%), non-Hispanic White (83.1%), used commercial insurance (40.8%), and traveled a distance of fewer than 30 minutes to the MAHEC Dental Health Center in Asheville, North Carolina (68.1%). For comparison, 40% of MAHEC dental patients are age 60 or older, and 63% are female; racial demographics were not available.

Table 1. Demographics of 261 Dental Survey Respondents (N=261)

	<i>n</i> (%)		<i>n</i> (%)
Age (years)		Race/Ethnicity	
18-24	5 (1.9)	Non-Hispanic, White	217 (83.1)
25-29	13 (5.0)	Non-Hispanic, Black or African American	14 (5.4)
30-39	32 (12.4)	Hispanic or Latino	9 (3.4)
40-49	31 (12.0)	Asian	2 (0.8)
50-59	22 (8.5)	American Indian or Alaska Native	2 (0.8)
60-64	36 (14.0)	Prefer not to answer/Unknown	9 (3.4)
65 and older	119 (46.1)	2 or more choices*	8 (3.1)
Sex		Insurance type	
Female	183 (70.1)	Commercial insurance	106 (40.8)
Male	73 (28.0)	Medicaid	35 (13.5)
Other/Prefer not to answer	5 (1.9)	Medicare supplement	42 (16.2)
Travel distance to clinic		No insurance currently	61 (23.5)
Less than 30 minutes	177 (68.1)		
30 minutes to 1 hour	77 (29.6)		
More than 1 hour	6 (2.3)		

*Two or more includes those who checked white/Hispanic or Latino (2), Black or African American/White (1), Black or African American/Hispanic or Latino (2), American Indian or Alaska Native/White (1), and other race/ethnicity with a note of "2 or more" or "Mixed race".

Table 2. How COVID-19 Influenced Dental Care (N=261)

	Number of patients reporting they need this service* n	I came to my appointment n (%)	I plan to have this visit n (%)	I need this service but no plans to schedule yet n (%)
Dental cleaning/annual visit [†]	229	154 (67.2)	31 (13.5)	44 (19.2)
Fillings or crowns [†]	88	45 (51.1)	23 (26.1)	20 (22.7)
Root canal [†]	13	4 (30.8)	1 (7.7)	8 (61.5)
Dentures or partials [†]	26	4 (15.4)	5 (19.2)	17 (65.4)
Dental extraction [†]	32	15 (46.9)	4 (12.5)	13 (40.6)
Dental emergency ^{††}	31	24 (77.4)	2 (6.5)	5 (16.1)

*Number of patients reporting they need this service was calculated as the sum of those who came to the appointment, planned to have the visit, or needed the service but had no plans to reschedule yet.

[†]Respondent number varied per visit type: cleaning/annual visit n=259; fillings/crowns n=227; root canal n=209; dentures/partial n=210; extractions n=210; emergency n=211

^{††}Dental emergencies such as toothache or dental pain

Patients were asked whether they experienced barriers to, or concerns regarding, dental care during the COVID-19 pandemic. The most common barrier reported was “I am worried that I will contract COVID-19 if I come to the office.” (21.2%), followed by “My treatment is not urgent.” (20%). Others stated that they had not been able to reschedule appointments canceled by their dentist, that they were unable to come to the office during business hours due to lack of childcare, or that they were concerned about spreading COVID-19 to others.

Patients were asked how COVID-19 influenced how they sought dental care. Of those needing a service, a majority of patients came for dental emergencies (24/31, 77.4%), dental cleaning/annual visit (154/229, 67.2%), and fillings or crowns (45/88, 51.1%) (**Table 2**).

Of the respondents who reported needing a service but having no plans to reschedule, the reason stated by the most people (11.9%) was, “I do not feel comfortable coming to the office during COVID-19.” Others said the “problem is not severe enough to seek treatment yet” (6.5%), they “cannot afford the service right now” (4.6%), or they were “unable to get to the dental office during COVID-19” (2.7%). Additional write-in responses included lack of time, staying home due to COVID-19, or difficulty scheduling appointments.

The safety considerations most commonly selected as important were the masking of all patients (92.7%) and social distancing in the waiting room (92.7%) (**Table 3**). Few respondents (16.1%) supported mandatory COVID-19 testing before a dental visit.

Almost half of the survey respondents (47.9%) stated that patients should not be required to have a COVID-19 test before a non-emergency dental visit, though 60.4% stated they would be willing to get a COVID-19 nasal swab test at a drive-through MAHEC clinic 30 minutes before their visit (**Table 3**). When asked about testing locations, 57.2% felt “very comfortable” getting a COVID-19 nasal swab at the dental office while 70.5% felt “very comfortable” getting a test at a primary care office (**Table 3**).

When asked if it would be appropriate for qualified dental staff to administer COVID-19 vaccinations, 47.3% of survey respondents said “yes”, 31.9% said “not sure”, and 20.8% said “no” (**Table 3**). Write-in answers for why participants did not think it would be appropriate included the type of personnel/perceived lack of training (76.5%) and the belief that a different location, such as a primary care office or pharmacy, would be more appropriate (21.6%). One participant wrote, “I don’t usually think of dentists as doing injections.”

Table 3. Dental Patient Opinions on Safety Precautions, COVID-19 Testing, and Vaccination

Safety precautions (N=261)	n (%)
All patients should get tested for COVID-19 before an appointment.	42 (16.1)
All dental staff should get tested for COVID-19 weekly.	165 (63.2)
Dental staff should wear a disposable gown.	180 (69.0)
Dental staff should wear an N95 face mask.	230 (88.1)
Social distancing should be required in the waiting room.	242 (92.7)
Hand sanitizer should be available.	234 (89.7)
Masks should be required for all patients.	242 (92.7)
COVID-19 testing should be required before a non-emergency dental visit (N=259)	n (%)
Yes	38 (14.7)
Not sure	97 (37.5)
No	124 (47.9)
Willing to get a COVID-19 nasal swab test (N=250)	n (%)
At MAHEC clinic, 30 mins before visit	151 (60.4)
At MAHEC clinic, 2 days before visit	104 (41.6)
At physician near patient's home, 2 days before	59 (23.6)
No, not willing	56 (22.4)
Comfortable getting a nasal swab test at dental office (N=222)	n (%)
Very comfortable	127 (57.2)
Moderately comfortable	71 (27.2)
Not at all comfortable	24 (9.2)
Comfortable getting a nasal swab test at primary care office (N=207)	n (%)
Very comfortable	146 (70.5)
Moderately comfortable	48 (23.2)
Not at all comfortable	13 (6.3)
Appropriate for qualified dental office staff to administer COVID-19 vaccinations when they are available (N=260)	n (%)
Yes	123 (47.3)
Not sure	83 (31.9)
No	54 (20.8)

Discussion

The COVID-19 pandemic affected medical and dental care throughout the country.^{2,6} Early in the pandemic (2020), dental offices, including the MAHEC dental clinic, were closed except for dental emergencies. Offices reopened following safety precautions published by the ADA.⁵ Our survey showed that while a portion of respondents was concerned about contracting COVID-19 at the dental office, most were willing to come into the office for dental care during the pandemic.

We found that 60% of all respondents came in for a routine cleaning, and of those needing emergency care during the pandemic, more than half came in for treatment. A national study early in the pandemic (May – June 2020) found that delays in care were less common for urgent-type visits, but fairly common for routine care.² Our study shows that later in the pandemic (November – December 2020), patients sought routine care; however, we found that patients were still delaying certain types of care, such as dentures and root ca-

nals. Even during non-pandemic times, dental care has been shown to be delayed or avoided for reasons such as finances, anxiety, lack of transportation, and time.¹⁵ Our respondents noted that the primary barriers to dental care attainment were fear of contracting COVID-19, COVID-19-related childcare issues, financial issues, and scheduling issues.

A majority of our respondents endorsed each of the safety precautions cited in the survey, except for the requirement that all patients be tested for COVID-19 before an appointment, which was endorsed by only 16%. At the time of this writing, the ADA supported COVID-19 rapid testing for all dental patients immediately before treatment.⁵ However, our survey results indicated that this was not a popular safety precaution with patients. Although most respondents did not agree with mandatory testing, the majority were willing to be tested 30 minutes before their appointment. Additionally, the majority of respondents reported comfort with nasal swab testing at the dental office. Access to COVID-19 testing was a problem in many parts of the US¹⁶; testing in dental offices may offer another potential location for COVID-19 testing.

With vaccine hesitancy, it is imperative to identify ways to build trust. A recent study found that participants' willingness to be vaccinated increased when they thought their health-care provider would recommend the vaccine.¹⁷ Thus, dental offices could be helpful in the COVID-19 vaccine rollout. In North Carolina, at this time, dentists are not legally allowed to administer vaccinations. At the time of this writing, efforts are being made to change this situation in North Carolina and nationally.¹⁸ Dentists undergo extensive training, routinely give injections, and are accustomed to managing potential complications. We found just under half of the patients surveyed thought it appropriate for qualified dental office staff to administer COVID-19 vaccinations, with a third of the respondents being unsure of the appropriateness, and only 21% thinking it was not appropriate. Patients stating they did not feel it appropriate for dentists to give vaccines gave reasons such as comfort at being vaccinated through usual mechanisms (eg, primary care, pharmacy) and perceptions that dentists focus on oral care only. In addition to COVID-19, the

dental office could be a provider of other routine vaccines, expanding public health and medical care resources. This may be particularly strategic for underserved and rural communities.¹⁹

The present study has several limitations. First, this study is a point-in-time snapshot of opinions during the COVID-19 pandemic from November to December 2020. Opinions on safety precautions and dental care obtainment may change with new COVID-19 information. Our assessment of how the pandemic altered care-seeking behaviors is confined by not having a baseline on our patients' care avoidance during non-pandemic times. We could not compare our results to other studies conducted earlier or later in the pandemic, as we found no other studies surveying US dental patients during this time period. Additionally, as our study used an emailed survey, there may be selection bias in respondents. Given limitations in our electronic health record management system, we were unable to compare racial demographics from our survey respondents with racial demographics from our overall patient population. Finally, due to our location and clinic model, our findings may not be representative of other dental clinics or communities, or of people who do not usually visit dental clinics.

Conclusion

The results of this survey shed light on patients' opinions on barriers to dental care, such as, COVID-19 safety precautions and COVID-19 vaccination in the dental office setting during the COVID-19 pandemic. Our participants responded that the primary barriers to dental care during the pandemic were fear of contracting COVID-19, COVID-19-related childcare issues, financial issues, and scheduling issues. A majority of participants endorsed the need for COVID-19 safety precautions in the dental office setting. Respondents were mixed on whether the dental office was an acceptable site for COVID-19 administration. Engaging the dental team in COVID-19 detection and immunization can be a creative solution to integrating existing resources and helping to mitigate public health crises.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Appendix A.

Introduction

Researchers at the Mountain Area Health Education Center (MAHEC) Dental Health Center invite you to participate in a 5-minute survey on COVID-19-related safety measures in our office. You have received this invitation because you have been seen at our clinic in the past year and we would love to hear your feedback!

Participation is voluntary and confidential; you can choose not to answer any question. Your decision about whether or not to take this survey will not have any impact on your standing as a patient at the MAHEC Dental Health Center. You will be given the option to receive a \$10 gift card as a thank-you.

To complete this survey, or to exit this research opportunity, please select your desired option below:

- Take me to the survey; I am over the age of 18 and have been a MAHEC Dental Health Center patient.
- Exit; I would prefer not to participate in this survey.

Barriers to Visiting the Dentist

Do you have any concerns about going to the dentist during the COVID-19 pandemic? Check all that apply:

- I do not have concerns.
- I am worried that I will contract COVID-19 if I come to the office. My treatment is not urgent.
- My dentist canceled and I have not been able to reschedule.
- I have kids at home due to COVID-19 and am unable to come to appointments during business hours.
- Please write down any other concerns or barriers here.

Please help us understand if and how COVID-19 has influenced your dental care. Click on one answer for each row, whether or not you need this type of care.

	I have not needed this service since the COVID-19 pandemic.	I came to my appointment during the COVID-19 pandemic.	I plan to have this visit before the end of 2020.	I need this service but have no plans to reschedule yet.
Cleaning or annual visit	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fillings or crowns	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Root canal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dentures or partials	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental extraction	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Dental emergency such as toothache/dental pain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

You said that you will not be scheduling one or more of the above services. Can you tell us why? Please check all that apply.

- I cannot afford this service right now.
- I do not feel comfortable coming to the office during COVID-19.
- Due to COVID-19-related circumstances, I am unable to get to the dental office (either at all or during normal business hours).
- My problem is not severe enough to seek treatment yet.
- Other reason, please write it here:

Safety

- Which of the following do you consider important for patient/staff safety during the COVID-19 pandemic? Check all that apply:
- All patients should get tested for COVID-19 before an appointment. All dental staff should get tested for COVID-19 weekly.
- Dental staff should wear a disposable gown. Dental staff should wear an N95 face mask. Social distancing should be required in the waiting room.
- Hand sanitizer should be available.
- Mask should be required for all patients.
- Are there other safety precautions that are important to you? Please specify

Testing

Do you think that COVID-19 testing should be required before a non-emergency dental visit?

- Yes, I think it should be required.
- No, I don't think it should be required.
- I am not sure.

Would you be willing to get a COVID-19 nasal swab test (inside the nose) as a requirement before coming in for a non-emergency dental visit at the following locations and during the following time frames? Check all that apply:

- Yes, at a drive-through at the Asheville MAHEC clinic, 30 minutes before the dental visit.
- Yes, at a drive-through at the Asheville MAHEC clinic, 2 days before the dental visit.
- Yes, at a physician's office near your home, 2 days before the dental visit.
- No, I am not willing to get a COVID-19 nasal swab test as a requirement before coming in for a non-emergency dental visit.

Please explain any concerns you have about COVID-19 testing or skip to the next question.

Would you feel comfortable getting a nasal swab COVID-19 test at your:

- Dental office
- Primary care doctor's office

Do you think that it will be appropriate for qualified dental office staff to administer COVID-19 vaccinations when they are available?

- Yes
- No
- Not sure

Why don't you think it would be appropriate for dental office staff to provide COVID-19 vaccinations?

Is there anything else you would like to add or feedback you would like to give?

Demographics

Please answer several demographic questions to help us ensure we hear from a wide range of our patients.

Your age:

Gender identity:

- Female
- Male
- Prefer not to answer
- Other

Race/ethnicity. Please check all that apply:

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian
- Other Pacific Islander
- White
- Other

Dental insurance:

- Commercial insurance (through work or purchased)
- Medicaid
- Medicare supplement
- Other insurance
- No insurance currently

What is your approximate travel time from your home to the MAHEC Dental Health Center in Asheville, NC?

- Less than 30 minutes
- 30 minutes to 1 hour
- More than 1 hour

Thank you for completing the survey! To receive your \$10 gift card, please click one option below. (Note that we cannot send gift cards to MAHEC email addresses. MAHEC employees, please indicate a personal email address where we can send the gift card.)

- I received this survey at a MAHEC email address. Please send my \$10 gift card to my personal email:
- Please send my \$10 gift card to the email address where I received the survey.
- No thank you

Choose your \$10 gift card from the following list: (Please allow a week for your gift card to be emailed)

- Amazon
- CVS
- Target