

Willingness to visit the pediatric dentist during the COVID-19 pandemic

Charles Michael Rossitch¹, Emily Adams¹, Michael Rossitch¹

¹ The Walker School, Marietta, Georgia

SUMMARY

The COVID-19 pandemic has introduced many issues to healthcare. Many people, including children, are missing important appointments because they are viewed as nonessential. Pediatric dentist appointments are a possible example of a commonly missed appointment since many parents do not view dental care as vital. The purpose of this study was to determine how the COVID-19 pandemic has affected parents' willingness to allow their children to visit a suburban Atlanta pediatric dental practice and what safety measures make parents feel more comfortable about their children visiting the dentist. We hypothesized that parents would be less willing to allow their child to visit the dentist due to anxiety caused by the COVID-19 pandemic. The data showed a weak positive correlation between parents' unwillingness to allow their child to visit the dentist and the COVID-19 pandemic. However, the majority of parents would allow their child to visit the dentist because anxiety towards visiting the dentist during the pandemic was found to be low. An electronic survey collected data on parents' anxiety towards the pandemic and going to the dentist during the pandemic, safety measures that would make them more comfortable going to the dentist, and demographic information. Data were analyzed using risk ratio (RR) tables. We counted and categorized the responses, learning that protective gear (like masks) was the most commonly requested safety measure. Dentists can use this information to increase parents' willingness to bring their children to the dentist.

INTRODUCTION

Dental appointments for young children are crucial to their oral health, and children who go to a preventive dental appointment at a younger age are not as likely to require restorative or emergency dental appointments in the future (1). A five-year study that followed a group of children in the Medicaid program showed that only 27% saw the dentist for a preventive appointment before their 5th birthday (1). Of the group studied, 0.25% of children saw the dentist for a preventive visit before their first birthday (1). Children are recommended to see the dentist as early as six months old to be assessed for the risk of early childhood caries (ECC), and they should have a dentist to go to by 1-year-old (1). ECC occurs when a five-year-old or younger child experiences tooth decay in one or more primary (baby) teeth (1). ECC in children 5-years-old

and below has a significant impact on the overall health of a child. Children experiencing ECC are much more likely to be underweight than children without ECC, which puts them at an elevated risk for other health conditions (1). Underweight children are more likely to experience malnutrition or osteoporosis, and they are also less active, putting them at a higher risk for cardiovascular disease (3). Preventive dental appointments for young children significantly lower the risk of ECC (1). With the COVID-19 pandemic, the delay of pediatric dental appointments has become a critical concern.

The COVID-19 pandemic has caused many to delay or cancel healthcare appointments to shelter in place, as demonstrated by the vast decrease in vaccination rates among children. Data was collected and analyzed from the Michigan Care Improvement Registry to determine the effect of the COVID-19 pandemic on vaccine coverage for children of ages ranging from 1 to 24 months (4). The data showed that of the participants (between 9,269 and 9,539), there were 17% fewer 5-month-olds who were up to date on their vaccines in May 2020 than in the previous four years (4). All other age groups showed a decrease in up-to-date vaccination status as well (4). There was a 21.5% decrease in influenza vaccines administered to people 18 years or below and a 15.5% decrease in influenza vaccines administered to children 24 months old or below from January to April 2020 (4). The percentage of vaccinations administered dropped heavily after the United States declared a state of emergency on March 13, 2020 (4). Like dental appointments, vaccination plays an incredible role in preventing diseases and cancers such as the ones caused by HPV, but parents are avoiding these appointments to prevent possible contraction of COVID-19 (5). Vaccination appointments are not the only appointments that have seen a drop in attendance amid the COVID-19 pandemic. The amount of clinic and hospital visits has also decreased significantly during the coronavirus pandemic because of people's efforts to avoid contracting COVID-19 (6). As of April 23, 2020, the number of outpatient care visits had decreased close to 60% (7). Telemedicine visits have replaced some of the preventive visits, while other preventive visits have been pushed back (7). This fear of healthcare during the COVID-19 pandemic is also present in the field of dentistry. A study was conducted to show the effects of quarantine caused by the COVID-19 pandemic on adult patient anxiety and willingness to attend orthodontist appointments (8). The study concluded that anxiety from quarantine and the pandemic had a significant association

with patients' willingness to go to orthodontist appointments and anxiety towards the orthodontist appointments (8). Some strategies helped decrease the anxiety of patients, like preventing contamination, requiring masks, and providing alcohol gels (8).

In addition to anxiety due to the COVID-19 pandemic, the World Health Organization (WHO) recommended a delay in dental treatment in certain areas to attempt to avoid the transmission of the virus through dental offices (9). The media left out that delaying "routine oral health care is only suggested in an intense uncontrolled community transmission scenario," which could have caused more patients to worry about or cancel their appointments across the world (9). The WHO deemed dental services as less essential (9). The American Dental Association (ADA) disagreed with deeming dentistry less essential because oral care plays a large role in overall health (9).

Delaying dental appointments can be dangerous to the health of children. This study specifically investigated the frequency, and the reasons parents canceled their children's dentist appointments due to COVID-19 concerns in a suburban Atlanta pediatric dental practice. It was hypothesized that the COVID-19 pandemic would incite fear and anxiety, causing parents to be significantly less willing to bring their child to a dental appointment. This study determined the reasons parents are worried about or delay their children's dental appointments so that dentists can find ways to meet parents' needs. Because of the importance of children attending dentist appointments to their overall health, dentists need to find ways to make the parents feel safer at appointments. This study shows that the majority of parents of patients at the suburban Atlanta dental practice are not anxious about visiting the dentist during the pandemic, so very few will miss appointments due to anxiety created by COVID-19. Protective gear like masks and face shields in the office also helps lower the anxiety towards visiting the dentist during the COVID-19 pandemic.

RESULTS

Surveys were emailed to 4,470 contacts for patients at a suburban Atlanta pediatric dental practice, and of the 4,470 emails sent to contacts for parents at the suburban Atlanta pediatric dental practice, 424 responses were collected, meaning the response rate was approximately 9.49%. Mothers responded 94.1% of the time, fathers responded 4.7% of the time, and 1.2% responded as "other." 74.5% of respondents reported that they feel safe during the pandemic, while 25.5% responded that they do not feel safe.

Level of Anxiety Towards the Pandemic	1 (low)	2	3	4	5 (high)
Percent of Respondents with this level of anxiety	23.2	27	28.4	17	4.5

Table 1: Percentage of Respondents' Levels of Anxiety Towards the COVID-19 Pandemic (n = 423)

Level of Anxiety towards visiting the dentist during the COVID-19 Pandemic	1 (low)	2	3	4	5 (high)
Percent of respondents with this level of anxiety	44.1	20.6	19.7	12.1	3.6

Table 2: Percentage of Respondents' Levels of Anxiety Towards Visiting the Dentist During the COVID-19 Pandemic (n = 422)

		Willingness to Visit the Dentist		Totals
		Willing	Not Willing	
Anxiety	Low Anxiety	273	0	273
	High Anxiety	130	19	149
Totals		403	19	422

Table 3: Relative risk of anxiety level and willingness to visit the dentist. A significant correlation was seen between anxiety towards the COVID-19 pandemic and the willingness of parents to allow their children to visit the dentist. (Generated Using Open Epi)

The confidence interval for all calculations is the same (CI: 95%; alpha = 0.05). Parents were 1.10 ± 0.05 times more likely to be willing to allow their child to visit the dentist for any type of appointment when they rated their general anxiety towards the COVID-19 pandemic as low (1-2) rather than moderate or high (3+) (Table 1). In addition, parents were 1.15 ± 0.07 times more likely to be willing to allow their child to visit the dentist for any type of appointment when they rated their anxiety specifically towards visiting the dentist as low (Table 2-3).

Fathers who responded to the survey were 0.99 (0.90-1.10) times as likely to be willing to allow their child to visit the dentist for any type of appointment (including non-emergency) than mothers who responded to the survey. Because the confidence interval straddles 1, this relative risk (RR) output is not statistically significant. Parents with a patient between ages 0 and 3 years old were 0.94 ± 0.05 times as likely to be willing to allow their child to visit the dentist for any type of appointment than those with older children. Those with private dental insurance were 1.01 ± 0.1 times more likely to be willing to allow their child to visit the dentist for any type of appointment (including non-emergency) than those with Medicaid or no dental insurance.

While there is statistically significant information stating parents with high anxiety towards the pandemic and/or dentist appointments during the pandemic are less willing to allow their child to visit the dentist than those who reported low anxiety, only 19 out of the 424 people who completed the survey said they would only let their child visit the dentist during an emergency, and 0 parents would not allow their child to visit under any circumstances.

Respondents were asked to list safety measures the office could take that would make them more comfortable about visiting the dentist, and their responses were compiled into 7 categories (Table 4). 59% of respondents answered that there were safety measures that would make them feel more comfortable visiting the dentist. 239 respondents provided an example of what would make them feel more comfortable. 189 people did not answer this question. Those who did not

answer the question were counted as being happy with the current measures taken by the office and are accounted for in **Table 4**.

35.8% of respondents recommended protective gear (such as masks, gloves, or face shields) as a safety measure, and protective gear was already being used in the office at the time of the survey. 25.7% of respondents recommended limiting personal contact and increased spacing between patients, and limiting contact was already occurring in the office at the time of the survey. 3.3% of respondents recommended removing the game room, paperwork, and/or other touchable objects. At the time of the survey, the office had already removed the game room but not paperwork. 1.2% of people recommended that the office notify parents of current measures and known exposures, which the office had already been doing at the time of the survey. The category recommending that patients and staff should be screened and staff should be tested for the virus was recommended by 11.1%. Patients and staff were already being screened upon arrival, but the offices staff were not required to be tested. The category of increased cleaning included all responses that mentioned sanitizer in the office, air filtration systems, and deeper cleaning between patients. 27.8% recommended things that fit this category, and the office was already accommodating these responses at the time of the survey. Respondents could also state they were happy with the office's current safety measures, even if they had suggested other recommendations. In total, 54% of the respondents stated they were happy with the current safety measures.

DISCUSSION

This study examined many factors that could affect parents' willingness to allow their children to visit the dentist. Because of the fear generated by the COVID-19 pandemic and the nature of dentist appointments, we hypothesized that parents would be significantly less willing to allow their children to visit the dentist, and many children would not receive essential treatment (including preventative care) during the COVID-19 pandemic.

The study looked at areas such as anxiety towards the pandemic, anxiety towards the dentist during the pandemic, the respondents' relation to the patient, the age of the patient, and the type of dental insurance to see if there was a correlation with the willingness to allow children to visit the dentist. If the confidence interval for the event did not straddle 1, the data was viewed as statistically significant. The strongest statistically significant correlation showed that parents with low anxiety towards the dentist during COVID-19 were not causing their children to miss dental appointments because their anxiety towards visiting the dentist during the pandemic was lower than their anxiety towards the pandemic itself. This information shows that even some of the parents concerned about the pandemic as a whole feel safe with the idea of visiting the dentist, so some parents with higher anxiety towards COVID-19 will still feel comfortable with their

Safety Measures	% of parents who recommended the safety measure
Protective gear like masks, gloves, and face shields	35.8
Limiting personal contact and more spacing of those within the office	25.7
Limiting touch surfaces	3.3
Communication of the current safety measures and notifications of known exposures	1.2
Staff tested for the virus or staff and patients screened daily upon entering the office	11.1
Increased cleaning, available hand sanitizer, and air filtration	27.8
Happy with the current measures taken by the office	54.0

Table 4: Percentage of Respondents that suggested implementation of one of more safety measures. Respondents could provide answers that fit into one or more groups. Survey responses where no answer was provided for this question were counted as being happy with the current measures.

child visiting the dentist. Many parents do not understand the importance of early, preventive dental appointments for children, so parents with children age 0 to 3 were likely less willing to visit the dentist during the pandemic because of a lack of knowledge regarding these appointments. These parents may have viewed these appointments as nonessential and viewed the risk of the pandemic more daunting, regardless of their anxiety level. The lack of statistical significance between the relationship to the parent and willingness to visit the dentist during the pandemic is likely due to the large difference in the amount of response between mother and fathers. The vast majority of the surveys were mothers, so the lack of fathers that responded to the survey makes it difficult to draw correlations between who completed the survey and their willingness to visit the dentist.

While many of the RRs did show a statistically significant positive correlation, the correlations were not very strong. For example, the strongest positive correlation was only $1.15 \pm .07$, which means they are only about 15% more likely to visit the dentist. 15% is a significant percentage, but a relatively small portion of 100%. The strongest correlation measured was between parents with low anxiety towards visiting the dentist and their willingness to visit the dentist during the pandemic. This information is important because it suggests the majority of parents are willing to allow their child to visit the dentist for all types of dental appointments during the pandemic.

The data found in this study did not support the hypothesis that parents would be significantly less willing to allow their children to visit the dentist during the COVID-19 pandemic due to increased levels of anxiety. Instead, this study shows that the COVID-19 pandemic has had a very small effect on parents' willingness to allow their children to visit this specific dental practice, Rossitch Pediatric Dentistry. The majority of patients at this dental practice are not avoiding scheduling

appointments due to the pandemic. At the time of the survey, the shelter in place order in Georgia had long been expired, and many businesses had already opened back up. Aside from increased safety measures, pre-pandemic societal practices had already resumed, so it is unlikely that many cancellations related to shelter in place orders occurred during this study's timeframe.

While this study provides valuable information about how the pandemic has affected pediatric dental appointment attendance, this study had limitations. This study only gathered responses from one dental practice in Marietta, Georgia, and the COVID-19 pandemic has been handled in a more relaxed manner in Georgia than many other states such as California, which may contribute to the large number of parents willing to allow their children to visit the dentist during this time. If this study was conducted on a larger geographic scale, results might have varied. None of the questions on the survey were required, so not all questions were answered by all 424 people. Surveys could also be completed an unlimited number of times. Parents were instructed to only complete the survey once no matter how many children they had who are patients of record. Multiple duplicate responses were noted, and any duplicate responses found were excluded from analysis; however, there still may have been additional duplicate responses that were not noted. Recipients of the survey were emailed a list of safety measures the dental practice was implementing at the time, but many respondents recommended safety measures that were already in place. Because so many respondents recommended safety measures already in place, it can be assumed many of the respondents had not previously read through the office's current safety measures. Additionally, not everyone who completed the survey responded to this question. Those who did not answer the question were grouped with those who stated they were happy with how the dental practice was handling safety during the pandemic because it was assumed that nothing could make them feel more comfortable visiting the dentist. Converting responses into pre-defined categories was also challenging at times, which could also contribute to a level of uncertainty in the results. Additionally, racial information was not collected in this study. The pandemic has impacted different racial groups in different ways. The data recorded in the survey could vary if it were collected from an urban area instead of a suburban area. Urban areas are more racially diverse, meaning it is possible that anxiety towards the COVID-19 pandemic may vary from the anxiety levels in the suburban area surveyed.

This study investigated the willingness of parents to allow their children to visit the dentist during the COVID-19 pandemic for one specific dental practice. This study can be replicated on a larger scale by sending the survey to parents of patients at different pediatric dental practices in a variety of locations to gain a more accurate national or global picture. This information is crucial to understanding if children are receiving the dental care, specifically preventative, they

need in order to maximize their wellbeing. Dentists around the world will be able to learn of and implement the safety measures that parents indicated would make them feel more comfortable visiting the dentist. By meeting parents' safety needs, more parents would be willing to bring their children to the dentist, ensuring more children get the care they need.

MATERIALS AND METHODS

Many different survey platforms were evaluated before Google Forms was chosen as the platform to administer a survey. A survey with an informed consent statement was then created using Google Forms (**Appendix A**). The study was approved by the Institutional Review Board (IRB) at The Walker School, and the survey with the informed consent statement was sent out by email to the parent or guardian of every patient in the database of Rossitch Pediatric Dentistry, who provided the patient database. The survey was sent out after the shelter in place orders in Marietta, Georgia had been lifted. Survey recipients were given 12 days to complete the survey, and they were sent a reminder to complete the survey 4 days before the deadline.

The survey collected demographic information, information determining the parent or guardian's relation to the patient, anxiety levels toward the COVID-19 pandemic, willingness to allow the patient to visit the dentist, their feeling of safety during the COVID-19 pandemic, and any safety measures that make them feel more comfortable visiting the dentist. The data collected was then analyzed using the app OpenEpi and Google Sheets in order to assess relationships. RRs were used in this study to show statistical relationships. $RR = [A / (A+B)] / [C / (C+D)]$. This equation uses variables found in **Table 5**. In the RRs, not willing to allow the child to visit and only visit in an emergency scenario were grouped together in one category. All "yes" responses to question 7 represent that the respondent is willing to allow their child to visit the dentist under any circumstance (**Appendix A**). The confidence interval for all RR calculations was the same (CI: 95%; alpha = 0.05).

Data was also collected on which safety measures would make parents or guardians of patients more comfortable visiting the dentist through a free-response question on the survey. Responses varied and were categorized to determine highly requested safety measures (**Table 4**). Because respondents were able to list as many recommendations as they wanted, many respondents provided multiple

		Disease		Totals
		(+)	(-)	
Exposure	(+)	A	B	
	(-)	C	D	
Totals				

Table 5: Overview of variables involved in relative risk calculation. (+) represents the presence of exposure/disease and (-) represents absence of exposure/disease. The conditions labeled as "A", "B", "C", and "D" are used to calculate relative risk.

recommendations, causing their responses to fit into multiple categories. For example, if someone said “wearing masks and removing the game room,” their response would go into both the ‘Protective Gear’ and the ‘Limiting Touch Surfaces’ category. There were also many respondents who stated they were happy with current safety measures taken by the dental practice and still provided recommendations that fit other categories. The data collected was then shared with the practice’s dentists.

ACKNOWLEDGMENTS

This research was conducted at The Walker School between August 2020 and December 2020.

Received: December 16, 2020

Accepted: August 30, 2021

Published: March 24, 2022

REFERENCES

1. Savage, M. F., *et al.* “Early Preventive Dental Visits: Effects on Subsequent Utilization and Costs.” *Pediatrics*, vol. 114, no. 4, American Academy of Pediatrics, October 2004, doi.org/10.1542/peds.2003-0469-F
2. Anil, Sukumaran and Anand, Pradeep S. “Early Childhood Caries: Prevalence, Risk Factors, and Prevention.” *Front Pediatr*, vol. 5, no. 157, Frontiers Media SA, 18 July 2017, doi:10.3389/fped.2017.00157.
3. Borbon, Kate. “My Child’s Ribs Stick Out. Is He Underweight?” *Smart Parenting Philippines*. www.smartparenting.com.ph/health/your-kids-health/underweight-child-a00286-20200407. Accessed 17 Sept. 2020.
4. Bramer, Cristi A. *et al.* “Decline in Child Vaccination Coverage During the COVID-19 Pandemic - Michigan Care Improvement Registry, May 2016–May 2020.” *Centers for Disease Control and Prevention*. www.cdc.gov/mmwr/volumes/69/wr/mm6920e1.htm. Accessed 17 Sept. 2020.
5. Brandt, Heather. “Don’t Delay Your Child’s Vaccinations, Especially Now | Opinion.” *Newsweek*. www.newsweek.com/dont-delay-your-childs-vaccinations-especially-now-opinion-1524992. Accessed 26 August 2020.
6. Bruce, Giles. “What Most Worries a Child Vaccine Expert as Immunization Rates Plummet During COVID-19.” *Center for Health Journalism*. centerforhealthjournalism.org/2020/06/16/what-most-worries-child-vaccine-expert-vaccination-rates-plummet-during-covid-19. Accessed 28 August 2020.
7. Mehrotra, Ateev *et al.* “What Impact Has COVID-19 Had on Outpatient Visits? *The Commonwealth Fund*. www.commonwealthfund.org/publications/2020/apr/impact-covid-19-outpatient-visits. Accessed 17 September 2020.
8. Cotrin, Paula *et al.* “Impact of coronavirus pandemic in appointments and anxiety/concerns of patients regarding orthodontic treatment.” *Orthodontics & Craniofacial*

Research, vol. 23, no.4, John Wiley and Sons, Inc, 25 May 2020, doi.org/10.1111/ocr.12395

9. “ADA ‘Respectfully but Strongly Disagrees’ with WHO Guidance Recommending Delay of Dental Care.” *AA Family Dental Group*. <https://www.aafamilydentalgroup.com/blog/2020/8/14/ada-respectfully-yet-strongly-disagrees-with-who-guidance-recommending-delay-of-dental-care/>. Accessed 28 August 2020.

Copyright: © 2022 Charles Michael Rossitch, Emily Adams, and Michael Rossitch. All JEI articles are distributed under the attribution non-commercial, no derivative license (<http://creativecommons.org/licenses/by-nc-nd/3.0/>). This means that anyone is free to share, copy and distribute an unaltered article for non-commercial purposes provided the original author and source is credited.

Appendix A

Informed Consent

This study is being conducted by Charlie Rossitch at The Walker School in Marietta, Georgia. The purpose of this study is to evaluate the potential impact COVID-19 concerns have on parents' willingness to send their child to the dentist. This information could be used to inform safety measures dentists can use to make parents feel more comfortable about sending their child to a dentist appointment during the COVID-19 pandemic. Data collected will be used solely for academic purposes. The survey will take around 5 minutes, and the answers to these questions will be used anonymously. Participants are free to refrain from completing the survey. By completing this survey, you are indicating that you have read this information and are allowing your answers to be used in this study.

Dentist Visits During COVID-19 (Survey Questions)

- 1) What is your relation to the patient (your child)?
 - a) Mother
 - b) Father
 - c) Other

- 2) How many children do you have who are patients of record at Rossitch Pediatric Dentistry between 0 and 3 years old?
 - a) 0
 - b) 1
 - c) 2
 - d) 3
 - e) 4
 - f) 5+

- 3) How many children do you have who are patients of record at Rossitch Pediatric Dentistry 4 or more years old?
 - a) 0
 - b) 1
 - c) 2
 - d) 3
 - e) 4
 - f) 5+

4) How would you describe your anxiety towards the COVID-19 pandemic on a scale of 1-5? (1 = no anxiety and 5 = intense anxiety)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

5) How would you describe your anxiety towards your child visiting the dentist during the Covid-19 pandemic on a scale of 1-5? (1 = no anxiety and 5 = intense anxiety)

- a) 1
- b) 2
- c) 3
- d) 4
- e) 5

6) Do you feel safe during the COVID-19 pandemic?

- a) Yes
- b) No

7) Would you be willing to allow your child to attend a dentist appointment during the COVID-19 pandemic?

- a) Yes (proceed to question 9)
- b) Only in an emergency scenario (proceed to question 9)
- c) Not under any circumstance (proceed to question 8)

8) If you answered question 7 as “Not under any circumstance” which statement explains your reasoning? (Check all that apply)

- a) The potential exposure through the dentist or staff worries me
- b) The potential exposure through other patients worries me
- c) The potential exposure through contact with tools, chairs, and other items worry me
- d) I have heard recommendations to avoid the dentist

9) Do you believe that dentist appointments pose a high risk of viral transmission?

- a) Yes
- b) No

10) Are there certain safety measures that a dentist can use to make you feel more comfortable?

- a) Yes (proceed to question 11)
- b) No (Proceed to question 12)

11) If you responded “Yes” to question 10, what safety measures would make you feel more comfortable?

- a) _____

12) What type of insurance do you have?

- a) Private
- b) Medicaid
- c) Not Insured
- d) Other: _____

Thank you for completing this survey!