

# Changes in the Work Routine of Brazilian Pediatric Dentists due to the COVID-19 Pandemic: Schedule Organization, Search for Appointments and Financial Impact

Maria Eduarda Rodrigues Lisboa<sup>1</sup>, Mariana Gonzalez Cademartori<sup>1</sup>, Vanessa Polina Pereira da Costa<sup>1</sup>, Marília Leão Goettems<sup>1</sup>, Marina Sousa Azevedo<sup>1</sup>

<sup>1</sup>Graduate Program in Dentistry, Federal University of Pelotas, Pelotas, RS, Brazil.

**Corresponding author:** Marina Sousa Azevedo

**E-mail:** [marinasazevedo@gmail.com](mailto:marinasazevedo@gmail.com)

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## ABSTRACT

**Objective:** To evaluate the changes in the work routine of Brazilian pediatric dentists (PD) during the COVID-19 pandemic. **Material and Methods:** Dentists specializing in pediatric dentistry, working in public or private services, and attending children or adolescents were included. Data collection was performed through a self-administered online questionnaire. Demographic information such as gender, age, work experience time, city size, and place of work was collected; if specific preventive measures were adopted during the pandemic; if there was an increase in service prices and additional costs; and how did the search for urgent or elective dental care take place during 2020 and 2021. A descriptive analysis was performed. **Results:** A total of 270 PD answered the questionnaire, of which 52.6% interrupted elective care during the pandemic, more than half (51.1%) reduced the number of patients per shift, and more than 70% increased weekly hours. Regarding the financial aspect, 94.7% of participants reported having additional costs, and 51.8% increased the cost of their appointments. In 2020, 72.0% reported a decrease in searches for elective appointments and 58.7% an increase for urgent care. **Conclusion:** The COVID-19 pandemic affected the search for appointments and the routine of Brazilian PD. For many, the potential financial impact was due to additional costs, periods without patients, and price correction of appointments.

**Keywords:** Pediatric Dentistry; Pandemics; Coronavirus.

## Introduction

In March 2020, the World Health Organization declared a state of pandemic due to COVID-19, a disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), appeared in China at the end of 2019 and spread rapidly, causing thousands of deaths worldwide [1]. SARS-CoV is a highly virulent virus that can spread from infected individuals through respiratory and salivary droplets and aerosols [2].

Given the particularities of the dental care environment, at the beginning of the pandemic, due to uncertainties regarding the transmission mode of the new coronavirus, the requirement to reduce virus transmission and curb the evolution of new cases that were overloading health services, most dental appointments were suspended, being limited to emergency care only [3]. A significant reduction in the volume of dental treatments could be seen worldwide [4,5]. Since dental care is considered an essential service, later, with more excellent knowledge about the COVID-19 virus and the advent of vaccination, elective appointments gradually returned, with occasional interruptions according to the pandemic scenario.

Health agencies recommended measures to maintain the safety of dental care, such as scheduling patients more widely spaced, increasing opening hours, or reducing the number of appointments. The objective was to minimize possible contact with other patients in the waiting room and allow the recommended procedures to prevent and control infections in dental offices [6,7].

A Brazilian survey carried out at the height of the pandemic in 2020 showed a high impact on the clinical routines of dentists and an increase in financial costs, given the changes imposed by the pandemic [8]. This study was conducted with dentists in general; however, how much the pandemic can interfere with the care routine of Brazilian pediatric dentists has yet to be explored [7]. It is essential to point out that Pediatric Dentistry has some peculiarities, such as the use of toys and other devices during appointments to distract the patient and facilitate care, the mandatory presence of at least one companion per child during consultations [9], and in some cases it is necessary to use behavioral management techniques, which require very close professional contact with the child.

This study analyzed Brazilian Pediatric Dentists' perceptions of changes in their care routines due to the COVID-19 pandemic.

## Material and Methods

The article was written following the recommendations of "Strengthening the reporting of observational studies in epidemiology" [8].

### Ethical Considerations

This project was approved by the Ethics and Research Committee of the Faculty of Dentistry of the Federal University of Pelotas (Protocol number 4.913.636). The Informed Consent Form was available for the professionals before the questions. Those who agreed to participate were required to choose the 'accepted' option to proceed with the questionnaire.

### Study Design and Population

This is an observational, cross-sectional study carried out with dentists who regularly treat children and adolescents, who have a postgraduate degree in Pediatric Dentistry (specialization, residency, master's, or doctorate), and who work in public or private service. Professionals whose clinical activity was developed entirely as professors at an educational institution were excluded.

### Sample Calculation

Given a target population of almost 9,000 registered Pediatric Dentists in Brazil [10], it was estimated that 369 responses would be needed to guarantee a 95% confidence interval and a 5% margin of error.

### Recruitment of Participants

An online self-administered questionnaire was sent by e-mail, WhatsApp®, and Instagram® to Brazilian pediatric dentists from December/2021 to May/2022. Councils, postgraduate programs, and regional and national Pediatric Dentistry associations were asked to e-mail registered dentists, inviting them to respond to the questionnaire. An Instagram® profile was created where publications were made, some sponsored, about the study, and messages were sent directly to the professionals. In addition, the disclosure was made on WhatsApp® by sending the questionnaire link to dentists and groups of Pediatric Dentists.

### Questionnaire and Pre-Test

The professionals' profile questions (gender, place of work, age, size of the city and Brazilian macroregion in which they work, and time since graduation) and care routine during the COVID-19 pandemic (Table 1) were hosted on the SurveyMonkey® platform. The questionnaire was pre-tested by 14 dentists who were not part of the research to evaluate the wording of the questions.

**Table 1. Questions and answer alternatives for the questionnaire used for this study.**

Questions	Answer Alternatives
Have you adopted any of these measures regarding the care of children and adolescents during the pandemic (since March 2020)?	
1. Interruption of elective care for certain periods	1- No; 2-Yes.
2. Reduction in the number of patients per shift	1- No; 2-Yes.
3. Increased number of hours worked per week	1- No; 2-Yes.
Did the changes in your office and service routine resulting from the pandemic entail additional financial costs in your main place of work?	1- No; 2-Yes.
Has there been an increase in the prices of services/ appointments at your main place of work?	1- No; 2-Yes.
Considering the current pandemic in 2020, how do you evaluate the impact of the search for dental care for children and adolescents:	
1. Urgent appointments	1- Increased; 2-Decreased; 3-Did not notice changes.
2. Elective appointments	1- Increased; 2-Decreased; 3-Did not notice changes.
Considering the current pandemic, in 2021, how do you evaluate the impact of the search for dental care for children and adolescents:	
1. Urgent appointments	1- Increased; 2-Decreased; 3-Did not notice changes.
2. Elective appointments	1- Increased; 2-Decreased; 3-Did not notice changes.

### Statistical Analysis

Data was analyzed using the Stata 16.0 program (StataCorp LLC, College Station, TX, USA). A descriptive analysis was performed, with the relative and absolute frequencies of the studied variables presented. Variables without a response were treated as missing data and identified in the results tables.

### Results

The survey was answered by 276 participants, six of whom were excluded because they acted exclusively as professors. Thus, the total sample consisted of 270 Brazilian dentists with postgraduate degrees in pediatric

dentistry. Table 2 describes the profile of the participants. Most professionals interviewed were female (94.8%), aged between 30 and 39 (33.3%), had graduated for more than 25 years (25.9%), worked only in the private service (69.3%), in large cities (44.7%), and in the south region of Brazil (40%).

**Table 2. Demographic and professional profile of Brazilian pediatric dentists.**

Variables	N	%
<b>Sex</b>		
Female	256	94.8
Male	14	5.2
<b>Workplace</b>		
Public and private	57	21.1
Private	187	69.3
Public	26	9.6
<b>Age (Years)</b>		
20-29	55	20.4
30-39	90	33.3
40-49	58	21.5
50-59	50	18.5
Over 60	17	6.3
<b>The city where you work*#</b>		
Small	59	22.2
Medium	88	33.1
Large	119	44.7
<b>Time since graduation (Years)</b>		
Up to 5	44	16.3
5 to 10	57	21.1
10 to 15	38	14.1
15 to 20	30	11.1
20 to 25	31	11.5
Over 25	70	25.9
<b>Brazilian Macroregion</b>		
North	13	4.8
North East	33	12.2
Midwest	18	6.7
Southeast	98	36.3
South	108	40.0

\*Small (up to 100,000 residents), medium (from 100,000 to 500,000 residents), and large (over 500,000 residents); #Lost Data.

When asked about the measures adopted during dental care during the pandemic, 52.6% interrupted elective care for certain periods, 51.1% reduced the number of patients per shift, and 75.6% increased weekly hours. Concerning finances, 94.7% of Pediatric Dentists reported having additional costs at their primary workplace due to changes in the office and routine of care resulting from the pandemic. Regarding the price of appointments /attendance, 51.8% answered that they did not increase the values (Table 3).

**Table 3. Measures adopted by Brazilian pediatric dentists regarding dental care during the COVID-19 pandemic since its onset in March 2020.**

Measures Taken	No	Yes
	N (%)	N (%)
Interruption of elective care for certain periods	128 (47.4)	142 (52.6)
Reduction in the number of patients per shift	132 (48.9)	138 (51.1)
Increased number of hours worked per week	66 (24.4)	204 (75.6)
Additional costs*	13 (5.3)	231 (94.7)
Increase in the price of appointment*#	111 (48.2)	119 (51.8)

\*Missing Data; #Professionals who worked full-time in the public service; did not respond to this topic.

When asked about the impact of seeking dental care during the pandemic, 72.0% reported a decrease in elective appointments in 2020. Concerning 2021, only 18.4% reported a decline in the search for elective care. Regarding the search for urgent care, 58.7% of the participants noticed an increase in demand in 2020, and 42.3% saw a rise in 2021 (Table 4).

**Table 4. Perception of Brazilian pediatric dentists regarding the impact of the search for elective dental care (prevention, prophylaxis, restorative procedure, extraction, endodontic treatment) and emergency appointments (pain) of children and adolescents during the COVID-19 pandemic in 2020 and 2021.**

Variables	During the Year 2020	During the Year 2021
	N (%)	N (%)
Elective Appointments		
Increased	21 (8.5)	136 (55.7)
Decreased	177 (72.0)	45 (18.4)
Did not notice changes	48 (19.5)	63 (25.8)
Total	246 (100.0)	244 (100.0)
Urgent Appointments (Pain)		
Increased	141 (58.7)	102 (42.3)
Decreased	29 (12.1)	35 (14.5)
Did not notice changes	70 (29.2)	104 (43.2)
Total	240 (100.0)	241 (100.0)

## Discussion

The findings of this study highlight significant adjustments made by pediatric dentists in response to the COVID-19 pandemic. Notably, a substantial proportion of respondents reduced patient load per shift while increasing their weekly working hours, reflecting efforts to adapt to the evolving circumstances. Financial implications were also evident, with most participants experiencing additional costs at their workplace, albeit only a portion chose to raise appointment fees. Moreover, a discernible shift in patient behavior was observed, with a notable decrease in the demand for elective appointments sought during 2020 and an increase in demand for urgent care services. These findings underscore the multifaceted challenges faced by pediatric dental practitioners.

It is known that non-essential dental treatments were suspended at the beginning and in some specific periods of the pandemic [11]. In the present article, more than half of the interviewees reported having interrupted elective care for particular periods during the pandemic. A study with dentists from several countries showed that more than 70% of respondents closed their offices during the first wave of COVID, from April to May 2020. Professional and personal factors, such as fear of infection, workplace, and age of professionals were associated with this behavior and the nationality of dentists, as guidelines on providing dental care during the pandemic varied according to each country and local situation [5].

In Brazil, in the first weeks of the pandemic, the Ministry of Health (MS) recommended suspending elective dental care and maintaining urgent care throughout the national territory. Subsequently, the recommendation was a gradual and responsible return to usual activities under the epidemiological changes in each state and city to adjust the current moment to guarantee access and minimize the damage caused by the postponement of oral health care [12]. After the return of the elective appointments, specific interruptions of the appointments were suggested according to the pandemic scenario.

One of the suggested measures by the Occupational Safety and Health Administration (OSHA) during the pandemic was to consider extending clinic/office hours of operation or reducing the number of appointments to minimize the number of patients in the same room at the same time [6]. Also, intending to avoid crowds in

dental offices, the National Health Surveillance Agency (Anvisa) suggested scheduling appointments spaced far enough apart to minimize the possible contact of patients in the waiting room and, together, allow for the careful execution of procedures. Also, recommended disinfection procedures to reduce the risk of contamination by COVID-19 in dental offices [7]. In this article, half of the pediatric dentists reduced the number of patients per shift, and 3/4 reported that they increased the number of hours worked per week during the pandemic, probably following the guidelines then.

While protecting patients and professionals, the aforementioned measures raised financial concerns among dentists. In this survey, 94.7% of respondents reported having had additional costs during this period, and only half of respondents reported having increased the price of appointments /attendance. These data corroborate the results of other studies with Brazilian dentists in 2020, where most respondents reported increased financial costs and a low percentage reported price adjustments for patients [8,13].

The additional financial costs were most likely due to the need for extra personal protective equipment to be used by professionals, which, due to their growing demand and insufficient replacement, had inflated prices [9], in addition to the infrastructure changes in the work environment required by the pandemic context [8], which may also have generated extra expenses for professionals. Another challenge faced by professionals during the pandemic was the decrease in financial gain [14] due to the period in which the offices were closed or limited to emergency care and the reduction in the number of patients per shift, in addition to the decrease in searches for appointments.

In the present study, the perception regarding the search for dental care during the pandemic period varied according to the year (2020 or 2021) and type of consultation (elective or urgent). Most pediatric dentists interviewed in this article reported a decrease in the search for elective appointments in 2020. This decrease probably occurred due to the recommendations of health agencies to restrict themselves to urgent care and because of the fear of contagion of parents and children during appointments. A study carried out in August 2020 that assessed, through a questionnaire, the knowledge and attitudes of parents of pediatric patients regarding dental treatment during the COVID-19 pandemic showed that 34% of parents thought that dental clinics were more dangerous than other social media and 39.2% felt that dental instruments could infect their children during treatment. When asked, 'Would you visit the dentist if your child had a toothache?', most parents answered 'yes', but a notable 23.2% stated that even if their child had a toothache, they would not go to dental clinics [15].

In 2020, the impact of the pandemic on the Brazilian public dental service can be seen through a study that evaluated data on dental procedures promoted within the Unified Health System (SUS) from January to May. A 66% reduction in children's dental procedures was observed, reaching 89% in Brazil's most acute phase of the pandemic in April of the same year [16]. This is worrying data, considering the importance of regular visits to the dentist by children and adolescents to maintain oral health and prevent dental caries and orofacial pain, which have a negative impact on the Quality of Life Related to Oral Health [17,18].

In 2021, most pediatric dentists interviewed reported an increase in the search for elective care, even though April 2021 was considered the deadliest month of the pandemic [19]. The potential justification for this is that by then, immunizations against COVID-19 had already started to be distributed worldwide, and the pandemic had become more controlled [1]. Additionally, over time, the population became more knowledgeable about the virus, its forms of contagion, and protection, starting to deal better with the new circumstances. In addition, regulations for dental care were no longer restricted to emergency care during this period.

Despite this, about emergency appointments (pain), most Pediatric Dentists noticed an increase in searches for these services in 2020. In 2021, more than 40% reported an increase compared to the period before

the pandemic. In the first moment of the pandemic, appointments were limited to emergency care, which justifies the increase in searches for this service. However, this increase was still perceived by many pediatric dentists as possibly related to the accumulated need for dental care. A study of children in Greece showed that the lockdown due to COVID led to a significant increase in the need for treatment; children had more caries lesions and required more extensive treatments [20].

It can also be suggested that the search for regular and preventive dental care had not yet been reestablished by many guardians in 2021. One of the reasons may have been the delay in childhood vaccination; while adults received the first dose in early 2021, approximately one year later, children started receiving immunizations against COVID-19 [21]. Thus, it can be assumed that parents were still afraid of exposing their children without complete vaccination coverage against COVID-19 or even because they had not vaccinated their children due to the questioning regarding the safety and effectiveness of immunizations for COVID-19 in children [22].






This study has limitations, such as the lack of representativeness of Brazilian Pediatric Dentists since the number required in the sample calculation was not obtained, and the failure to represent some Brazilian macroregions. Several factors contributed to this shortfall, including the proliferation of online surveys during the pandemic, which may have led to survey fatigue among potential participants, decreasing their willingness to respond to additional questionnaires. Additionally, the inability to obtain contact information for specialist professionals from official records limited our ability to reach a broader and more diverse population. In addition, some responses may have been influenced by memory bias, as the questions considered the entire pandemic period, from the beginning of the pandemic until the moment the questionnaire was applied. It is also necessary to consider the possibility of a "response shift" [23] because the interviewees might have had a different perception if the questionnaire had been applied at the beginning or during a peak period of the pandemic. When this study was carried out, the pandemic situation was already more controlled, and professionals were already more adapted to the new scenario. Therefore, the data need to be interpreted with caution.

Despite challenges such as the discrepancy in response rates among Brazilian macroregions and the inability to achieve the intended sample size, this study possesses significant strengths that enhance its scientific contribution. Firstly, our rigorous methodology facilitated the collection of detailed and comprehensive data from a substantial sample of Brazilian pediatric dentists. Secondly, the study provided a nuanced understanding of the challenges and adaptations within the pediatric dentistry field during the pandemic. Through an examination of various aspects of dental care practices, including changes in patient load, working hours, financial implications, and shifts in patient behavior, our research offers valuable insights into the response of pediatric dentists to the COVID-19 pandemic. These findings contribute to the existing literature on pandemic response in the dental pediatric profession and can hold implications for public health policy decisions and practice management strategies to address future challenges.

## Conclusion

The COVID-19 pandemic implied changes in Brazilian pediatric dentists' routines and the search for child dental care. For many, there is a potential financial impact due to additional costs, periods without elective care decreases in searches for elective care, and the non-adjustment of prices for appointments/attendance. While our findings provide valuable insights into the challenges faced by pediatric dentists during the pandemic, it is important to acknowledge the lack of a comprehensive representation of Brazilian pediatric dentistry and the absence of a micro-costing analysis.

## Authors' Contributions

MERL		<a href="https://orcid.org/0000-0001-9224-4886">https://orcid.org/0000-0001-9224-4886</a>	Conceptualization, Methodology, Investigation, and Project Administration.
MGC		<a href="https://orcid.org/0000-0002-2433-8298">https://orcid.org/0000-0002-2433-8298</a>	Conceptualization, Methodology, and Investigation.
VPPC		<a href="https://orcid.org/0000-0003-0524-6870">https://orcid.org/0000-0003-0524-6870</a>	Conceptualization, Methodology, and Investigation.
MLG		<a href="https://orcid.org/0000-0002-6512-2602">https://orcid.org/0000-0002-6512-2602</a>	Conceptualization, Methodology, and Investigation.
MSA		<a href="https://orcid.org/0000-0002-7519-6808">https://orcid.org/0000-0002-7519-6808</a>	Conceptualization, Methodology, Investigation, Project Administration, and Funding Acquisition.
All authors declare that they contributed to a critical review of intellectual content and approval of the final version to be published.			

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## Conflict of Interest

The authors declare no conflicts of interest.

## Data Availability

The data used to support the findings of this study can be made available upon request to the corresponding author.

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