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An overview of Dentistry during and after the COVID-19 pandemic period in Brazil

Uma visão geral da Odontologia durante e após o período pandêmico de COVID-19 no Brasil

Una visión general de la Odontología durante y después del período pandémico de COVID-19 en Brasil

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Abstract
This study investigated how Brazilian dentists are performing their clinical activities during the pandemic in different dentistry specialties and whether changes in biosafety protocols and the use of personal protective equipment (PPE) made will continue in the post-pandemic period. For that, a cross-sectional online questionnaire-based survey was presented to the volunteers. A total of 423 dentists (298 females) responded to the survey. Their age ranged from 22-73 (38.07 ± 10.58) years and years of dental practice ranged from 1-45 (14.68 ± 10.56). Most of the responders (66.43%) worked in private clinic. Since the beginning of the outbreak, 53.9% limited its activities only to urgent and emergency care; 75% starting limit its activities between March 18th and April 1st; and 25.88% limited for more than 15 weeks. Most of dentists are aware about the setting of dental office and are taking actions to prevent the transmission of the COVID-19 virus. The majority are all personal protective equipment. After the pandemic period, volunteers stated that will continue with the use of personal protective equipment, exception only to the use of the respirator. There was continuity of dental care, following the recommendations for safe care. There was a tendency for changes in relation to PPE to last after the end of the pandemic.
Keywords: Dentist; COVID-19; Personal protective equipment.

Resumo
Este estudo investigou como os dentistas brasileiros estão desempenhando suas atividades clínicas durante a pandemia nas diferentes especialidades e se as mudanças dos protocolos de biossegurança e do uso de equipamentos de proteção individual (EPIs) feitas continuarão no período pós pandêmico. Para isso, um questionário transversal online foi apresentado aos voluntários. Um total de 423 dentistas (298 mulheres) responderam à pesquisa. A idade deles variou de 22-73 (38,07 ± 10,58) anos e os anos de prática odontológica variaram de 1-45 (14,68 ± 10,56). A maioria dos respondentes (66,43%) trabalhava em clínica privada. Desde o início da pandemia, 53,9% limitaram suas atividades apenas aos atendimentos de urgência e emergência; 75% começaram a limitar suas atividades entre 18 de

março e 1º de abril; e 25,88% limitaram por mais de 15 semanas. A maioria dos dentistas está ciente sobre a ambientação do consultório odontológico e está tomando medidas para prevenir a transmissão do vírus COVID-19. A maioria usa todos os equipamentos de proteção individual. Após o período pandêmico, os voluntários afirmaram que continuarão com o uso dos equipamentos de proteção individual, exceção apenas para o uso do respirador. Houve continuidade do atendimento odontológico, seguindo as recomendações para um atendimento seguro. Houve tendência de que as mudanças em relação aos EPIs perdurarem após o fim da pandemia.
Palavras-chave: Dentista; COVID-19; Equipamento de proteção individual.

Resumen
Este estudio investigó cómo los dentistas brasileños están realizando su actividad clínica durante la pandemia en diferentes especialidades y si los cambios en los protocolos de bioseguridad y el uso de equipos de protección personal (EPP) realizados continuarán en el período pospandémico. Para eso, se presentó a los voluntarios un cuestionario transversal en línea. Un total de 423 dentistas (298 mujeres) respondieron a la encuesta. Su edad osciló entre 22 y 73 (38,07 ± 10,58) años y los años de práctica odontológica osciló entre 1 y 45 (14,68 ± 10,56). La mayoría de los encuestados (66,43%) trabajaba en una clínica privada. Desde el comienzo de la pandemia, el 53,9% limitó sus actividades a la atención de urgencia y emergencia únicamente; El 75% comenzó a limitar sus actividades entre el 18 de marzo y el 1 de abril; y 25,88% limitado por más de 15 semanas. La mayoría de los dentistas conocen el entorno de su consultorio dental y están tomando medidas para prevenir la transmisión del virus COVID-19. La mayoría usa todo el equipo de protección personal. Después del período de la pandemia, los voluntarios declararon que continuarán con el uso de equipo de protección personal, excepto por el uso de un respirador. La atención dental continuó, siguiendo las recomendaciones para una atención segura. Hubo una tendencia a que los cambios relacionados con el EPP persistieran después del final de la pandemia.
Palabras clave: Odontólogo; COVID-19; Equipo de protección personal.

1. Introduction

In December 2019, diagnoses were made in patients who, at first, they were thought to be only cases of pneumonia (Krishnan et al., 2021). The virus of unknown origin and which has spread widely in all countries was named new coronavirus (2019-nCoV) and it was later named as severe acute respiratory syndrome of coronavirus 2 (SARS-CoV-2) by the Coronavirus Study Group and coronavirus disease 2019 (COVID-19) by the World Health Organization (WHO) (Krishnan et al., 2021; WHO, 2021).

In January 2020, WHO announced a public health emergency of international concern and, on March 11th of that same year, the pandemic began (Krishnan et al., 2021; WHO, 2021). Thus, measures against crowding, use of protective masks, hand washing and use of 70% alcohol were significant for the prevention of infection (Chen et al., 2020). However, in the WHO epidemiological update of the first week of 2021, there were slightly less than 5 million new cases worldwide, a total of more than 88 million reported cases and more than 1,9 million deaths worldwide since the beginning of the pandemic (WHO, 2021).

Brazil is the third country with the highest number of confirmed COVID-19 cases (WHO, 2021; Buss et al., 2021). According to recent data, until October 2020, more than three hundred and sixty thousand health professionals were contaminated in Brazil, of these 384 died, being 16 dental surgeons (Ministério da Saúde, 2020).

At the beginning of the pandemic, authorities such as the American Dental Association instructed the dentists class to cease appointments and to suspend the treatment of patients, performing only emergency procedures (Coulthard, 2020; Odeh et al., 2020). This guidance is due to the high risk of cross-infection of the patient and dentists, due to the fact that most dental procedures generate large amounts of aerosols and droplets from the oral cavity, since saliva can act as a reservoir for SARS-CoV- 2 and, consequently, as a potential means of transmitting the virus and infections (Meng et al., 2020; Ge et al., 2020; Vergara-Buenaventura et al., 2020).

Considering that Dentistry is a profession with the highest risk of COVID-19 infection, compared to other professions, it measures for the protection and control of infection must be carried out to protect the dental team and patients (Banakar et al., 2020). Thus, guides and protocols are available for dentists and the entire team in order to control SARS-CoV-

2 infection (Phelan et al., 2020; Villani et al., 2020). Consequently, it is essential to use personal protective equipment (PPE) and use of disinfectants (Villani et al., 2020).

Among the protocols described, carrying out an accurate screening, measuring the temperature of the patient and the team (which should not exceed 37.3ºC), perform mouthwash prior to the treatment with oral antiseptics to reduce microorganisms in the oral cavity, avoid the use of instruments that produce aerosols and, as already mentioned, reinforce the use of personal protective equipment and redouble the care with disinfecting the environment (Vergara-Buenaventura et al., 2020; Villani et al., 2020, Kiliçarslan et al., 2020; Peng et al., 2020; Ren et al., 2020; Spagnuolo et al., 2020; Cagetti et al., 2020).

With the constant and necessary current fight against COVID-19, the world has changed habits and dentists must adapt as well. Moraes et al. (2020) performed a questionnaire survey to evaluate possible changes in dental coverage between public and private services in Brazil and its impact on economic burdens for dentists (Moraes et al., 2020). This study provides early evidence of three major impacts of the pandemic on dentistry: increasing inequalities due to coverage differences between public and private networks; the adoption of new clinical routines, which are associated with an economic burden for dentists; and associations of regional COVID-19 incidence/mortality with fear of contracting the disease at work.

2. Methodology

Research design

The project was approved by the Research Ethics Committee of the University of Western São Paulo - Unoeste, CAAE 35006620.6.0000.5515. The consent form was presented as the first question of the questionnaire.

Our study population consisted of dentists who work in Brazil, in either private and public clinics, hospitals, health centers, and/or dental education. This survey was conducted in August/September 2020. Dentists were approached through an email database, social networking groups, and personal contacts to participate in the research through an open google document. The online survey was kept available for 30 days.

It was not possible to determine the number of people who had access to the questionnaire, however professionals from all over Brazil had access and answered the questionnaire. Thus, the questionnaire represents the Brazilian population of dentists.

The inclusion criteria were 1) being dentist in Brazil with full graduation, 2) general practitioners and specialists in 3) endodontics, 4) periodontics, 5) prosthesis/oral rehabilitation, 6) operative dentistry, 7) surgery/implantology, and 8) orthodontics. Clinicians who operate and reside outside the country, being undergraduate and being professor but non-active in dental clinics outside the university were excluded from the research.

Questionnaire

The questionnaire included a personal and professional profile. As personal questions were collected information regarding to age, experience time as a dentist, place of work, and continuity of dental care during the outbreak. As professional questions were collected information regarding to the setting of dental offices, personal protective equipment during, and after the pandemic and changes in care in the different areas of Dentistry. The survey is shown in Table 1.

Table 1. Questionnaire.

(A) Demographics
1. Gender: ( ) Female ( ) Male
2. Age: (completed number) _____
3. Year that completed the Undergraduate Dentistry (for example 1998): _____
4. Workplace: ( ) Private practice
( ) Public practice
( ) Private and public practice
( ) Professor and private practice
( ) Professor and public practice
( ) Professor, private practice and public practice
5. Since the beginning of the pandemic, you:
( ) Were diagnosed with COVID-19 and were in domestic isolation
( ) Were hospitalized due to COVID-19
( ) Have had symptoms of COVID-19 but have not been tested to confirm
( ) Had no symptoms of COVID-19

(B) Performance in the pandemic period by COVID-19
1. Since March 18th, 2020:
( ) You continued to work normally
( ) You have limited your dental activities to urgent and emergency care only
( ) You stopped all your dental activities
2. When did you start limiting/stopped your activities calls?
( ) Between March 18th and April 1st
( ) Between 2 - 15 April
( ) Between 16 - 29 April
( ) Between April 30th and May 13th
( ) Between 14 – 27 May
( ) Between May 28th and June 10th
( ) Between 11 – 24 June
( ) Between June 25th and July 8th
3. How long did you limit/stop your activities calls?
( ) Between 1 - 2 weeks
( ) Between 2 - 3 weeks
( ) Between 3 - 4 weeks
( ) Between 4 - 5 weeks
( ) Between 5 - 6 weeks
( ) Between 6 - 7 weeks
( ) Between 7 - 8 weeks
( ) Between 8 - 9 weeks
( ) Between 9 - 10 weeks
( ) Between 10 - 11 weeks
( ) Between 11 - 12 weeks
( ) Between 12 - 13 weeks
( ) Between 13 - 14 weeks
( ) Between 14 - 15 weeks
( ) More than 15 weeks

(C) Setting of dental offices
1. Have you been screening patients over the phone prior to the appointment, especially for COVID-19? ( ) Yes ( ) No
2. Have you been providing more spaced appointments so that there is no crowding of patients in the waiting room? ( ) Yes ( ) No
3. Have you postponed treatments for elderly patients and / or those with systemic diseases? ( ) Yes ( ) No
4. Have you been washing and disinfecting your hands several times a day, more often than before the COVID-19 pandemic? ( ) Yes ( ) No
5. Have you been more rigorous in the disinfection and placement of protective barriers in the dental chair, benches, stool, high and low speed handpiece and other equipment? ( ) Yes ( ) No
6. Have you checked the patient's temperature before the appointment? ( ) Yes ( ) No
7. Have you checked the temperature of the entire work team? ( ) Yes ( ) No
8. Have you asked the patient to wash and / or disinfect the hands before starting the care? ( ) Yes ( ) No
9. Do you prohibit patients from entering the clinic if they are not wearing a mask? ( ) Yes ( ) No
10. Have you been avoiding the use of air conditioning and having frequent ventilation in the waiting room? ( ) Yes ( ) No
11. Did you get the books, magazines, newspapers and decorative objects out of the waiting room? ( ) Yes ( ) No
12. Did you take out decorative and non-essential objects for the care of the care room? ( ) Yes ( ) No
13. Have you kept your coats, bags and other personal items outside the waiting room or in closed cabinets? ( ) Yes ( ) No
14. Have you been instructing the patient not to bring a companion and, if he does, is he in the waiting room? ( ) Yes ( ) No
15. Do you use the patient's preoperative mouthwash with 1% hydrogen peroxide or 0.12-0.2% chlorhexidine or 0.2–1% povidone iodine? ( ) Yes ( ) No
16. Have you avoided the use of air conditioning and / or have you ventilated the care room for at least 10 minutes after each patient and during that period have you stayed out of the environment? ( ) Yes ( ) No
17. Have you avoided using the triple syringe (especially in the jet / air combination) and given priority to alternative methods of washing and drying the teeth or the oral cavity? ( ) Yes ( ) No
18. Have you avoided using the spitpan and given priority to suction with high power or gauze? ( ) Yes ( ) No
19. Did you start using products different from the ones you used to clean and disinfect the office and / or reception? ( ) Yes ( ) No
20. Did you make use of informational posters, seat and / or floor markings to guide patients to maintain social distance or to reduce the risk of contamination? ( ) Yes ( ) No

21. Did you provide alcohol gel for hand hygiene by the team or by the patients? ( ) Yes ( ) No
22. Did you decontaminate materials received from suppliers (eg dental)? ( ) Yes ( ) No
23. Did you choose to prefer panoramic x-rays and avoid requesting / performing periapical x-rays? ( ) Yes ( ) No
24. When possible, did you choose to do the telemonitoring to assess the need for the patient's face-to-face return with ongoing treatment? ( ) Yes ( ) No

(D) PPE during the COVID-19 pandemic

1. Lab coat - for care during the pandemic you:
   ( ) Only wear a lab coat
   ( ) Only wear disposable lab coat
   ( ) Wear both
   ( ) Do not wear lab coat
2. Bouffant - for care during the pandemic you:
   ( ) Only wear fabric bouffant
   ( ) Only wear disposable bouffant
   ( ) Wear both
   ( ) Do not wear bouffant
3. Face mask protection - for care during the pandemic you:
   ( ) Use only respirator PFF or N95
   ( ) Use only disposable face mask
   ( ) Make use of both
   ( ) Do not use a face mask protection
4. During the pandemic do you use shoe protectors or shoes for exclusive use in the dental office? ( ) Yes ( ) No
5. During the pandemic do you use protective goggles? ( ) Yes ( ) No
6. During the pandemic do you use face shield? ( ) Yes ( ) No
7. Gloves - for care during the pandemic you:
   ( ) Use only procedure glove and sterile surgical glove only in surgeries
   ( ) Use only nitrile glove and sterile surgical glove only in surgeries
   ( ) Use only sterile surgical glove for all procedures, surgical or not
   ( ) Use only procedure glove for all procedures, surgical or not
   ( ) Use only nitrile glove for all procedures, surgical or not
   ( ) Do not use gloves

(E) PPE in the post-pandemic period by COVID-19

1. Lab coat - after the pandemic you intend to:
   ( ) Only wear a lab coat
   ( ) Use only disposable lab coat
   ( ) Make use of both
   ( ) Do not use lab coat
2. Bouffant - after the pandemic you intend to:
   ( ) Use only fabric bouffant
   ( ) Use only disposable bouffant
   ( ) Make use of both
   ( ) Do not use a bouffant
3. Face mask protection - after the pandemic you intend to:
   ( ) Use only respirator PFF or N95
   ( ) Use only disposable face mask
   ( ) Make use of both
   ( ) Do not use a face mask protection
4. Do you intend to stop using the shoe protector or shoe for exclusive use in the post-pandemic dental office? ( ) Yes ( ) No
5. Do you intend to stop using the protective goggles? ( ) Yes ( ) No
6. Do you intend to stop using the face shield? ( ) Yes ( ) No
7. Gloves - after the pandemic you intend to:
   ( ) Use only procedure glove and sterile surgical glove only in surgeries
   ( ) Use only nitrile glove and sterile surgical glove only in surgeries
   ( ) Use only sterile surgical glove for all procedures, surgical or not
   ( ) Use only procedure glove for all procedures, surgical or not
   ( ) Use only nitrile glove for all procedures, surgical or not
   ( ) Do not use gloves

(F) Changes in care in different dental specialties

1. Dental specialties
   ( ) Endodontics
   ( ) Periodontology
   ( ) Dental prosthodontics
   ( ) Operative dentistry
   ( ) Surgery
   ( ) Implantology
   ( ) Orthodontists
   ( ) General practitioners
   ( ) Other

(G) Endodontics

1. Year that completed the specialization course in Endodontics (for example: 2000): _____
2. During the pandemic:
   ( ) The number of patients has increased
   ( ) The number of patients has decreased

( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Increase in cases of pain and endodontic problems, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During endodontic treatment during the pandemic period, have you avoided using ultrasound? ( ) Yes ( ) No
6. During endodontic treatment during the pandemic period, have you avoided using the high-speed pen through alternatives such as using Bioplic between sessions and performing scarification with curettes? ( ) Yes ( ) No
7. During endodontic treatment during the pandemic period, have you performed the coronary opening under absolute isolation? ( ) Yes ( ) No
8. During endodontic treatment during the pandemic period, have you recommended treatment in a single session to reduce the number of patients coming to the dental office? ( ) Yes ( ) No
9. During the pandemic period, have you been avoiding elective procedures? ( ) Yes ( ) No
10. During the pandemic period, did your office costs increase? ( ) Yes ( ) No
11. Did you pass this cost increase on to the amount the patient pays? ( ) Yes ( ) No

(H) Periodontology
1. Year that completed the specialization course in Periodontology (for example: 2000): _____
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased
( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to the increase in emergency cases, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During periodontal treatment during the pandemic period, have you avoided the use of ultrasound and / or bicarbonate jet and given preference to using manual curettes? ( ) Yes ( ) No
6. During surgical treatment during the pandemic period, have you avoided using the high-speed pen and given preference to using hand instruments (eg, chisel or bone file)? ( ) Yes ( ) No
7. During periodontal treatment during the pandemic period, did you reduce the number of regenerative or resective periodontal surgical procedures for therapeutic purposes? ( ) Yes ( ) No
8. During periodontal treatment during the pandemic period, did you reduce the number of regenerative or resective periodontal surgical procedures, for aesthetic purposes? ( ) Yes ( ) No

(I) Dental prosthodontics
1. Year that completed the specialization course in Prosthodontics (for example: 2000): _____
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased
( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to the increase in emergency cases, for example dental fractures and / or pain related to neuromuscular parafunction, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During the pandemic period, have you avoided strictly aesthetic procedures? ( ) Yes ( ) No
6. In cases of preparations that generate aerosol (eg preparation for fixed partial dentures, preparation of removable partial dentures ...), have you adopted the use of absolute insulation? ( ) Yes ( ) No
7. Before the pandemic, did you have a protocol for decontamination of molds, models or services that were sent to the dental laboratory? ( ) Yes ( ) No
8. During the pandemic period, did you adhere to a decontamination protocol for mold, model or services that were sent to the dental laboratory? ( ) Yes ( ) No

(J) Operative dentistry
1. Year that completed the specialization course in Operative Dentistry (for example: 2000): __
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased

( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to the increase in cases of sensitivity and / or dental fractures / restoration, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During restorative treatment during the pandemic period, have you avoided the use of high rotation, prioritizing the use of atraumatic restorative treatment (ART)? ( ) Yes ( ) No
6. During the pandemic period, have you performed the restorative procedure from the beginning, including removal of decayed tissue and / or defective restoration, under absolute isolation? ( ) Yes ( ) No
7. During the pandemic period, have you avoided strictly aesthetic procedures? ( ) Yes ( ) No

(K) Surgery
1. Year that completed the specialization course in Surgery (for example: 2000): _____
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased
( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to the increase in emergency cases, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During surgical treatment during the pandemic period, have you avoided using the high-speed pen and given preference to using hand instruments (eg chisel, gouging forceps or osteotome)? ( ) Yes ( ) No
6. During the pandemic period, did you reduce the number of regenerative surgical procedures, giving priority only to emergency care? ( ) Yes ( ) No
7. During the pandemic period, did you reduce the number of resective surgical procedures, giving priority only to emergency care? ( ) Yes ( ) No
8. During the pandemic period, did you reduce the number of orthognathic surgeries? ( ) Yes ( ) No

(L) Implantology
1. Year that completed the specialization course in Implantology (for example: 2000): _____
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased
( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to the increase in emergency cases, which may be related to the stress caused by this period
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above
5. During the pandemic period, did you reduce the number of regenerative surgical procedures, giving priority only to emergency care? ( ) Yes ( ) No
6. During the pandemic period, did you reduce the number of resective surgical procedures, giving priority only to emergency care? ( ) Yes ( ) No
7. During the pandemic period, did you reduce the number of procedures for installing implants, giving priority only to emergency care? ( ) Yes ( ) No

(M) Orthodontists
1. Year that completed the specialization course in Orthodontists (for example: 2000): _____
2. During the pandemic:
( ) The number of patients has increased
( ) The number of patients has decreased
( ) I have the same flow of patients
3. Which of the reasons below do you identify as the main justification for the increase in the number of patients?
( ) Fewer dentists attending
( ) Due to social isolation, people are looking for more oral health care
( ) All of the above
4. Which of the reasons below do you identify as the main justification for reducing the number of patients?
( ) Financial crisis that the country is going through
( ) Fear of people becoming contaminated in the dental environment
( ) Due to the social isolation that encourages people to stay at home
( ) All of the above

5. During maintenance consultations for orthodontic treatment during the pandemic period, have you avoided the use of ultrasound and / or bicarbonate jet and given preference to using manual curettes? ( ) Yes ( ) No
6. During maintenance consultations for orthodontic treatment during the pandemic period, have you avoided using the high-speed pen and given preference to using hand instruments (eg, sandpaper strip)? ( ) Yes ( ) No
7. During the pandemic period, have you avoided removing orthodontic appliances to avoid overuse of the high-speed pen? ( ) Yes ( ) No

Source: Authors.

3. Results

Personal profile

Due to the questionnaire distribution, through an email database, social networking groups, and personal contacts. A total of 423 dentists (298 females and 125 males) responded to the survey. Their age ranged from 22-73 years with a mean of 38.07 (SD 10.58) years. Years of dental practice ranged from 1-45 years with a mean of 14.68 (SD 10.56) years. Most of the responders (66.43%) worked in private clinic and 91.49% did not presented signs and symptoms of COVID-19, 4.49% were diagnosed with the ill and 4.02% presented signs and symptoms but were not diagnosed.

Since the beginning of the outbreak in Brazil on March 18th, 2020, 53.9% (n = 228) of the volunteers limited its activities only to urgent and emergency care; 75% (n = 171) starting limit its activities between March 18th and April 1st; and 25.88% (n = 59) limited for more than 15 weeks. Only 13.71% (n = 58) stopped all clinical activities and 32.39% (n = 137) continued working normally.

The participants' characteristics are shown in Table 2.

Table 2: Demographics participants' characteristics.

		n	%
Gender	Male	125	29.5
	Female	298	70.5
Age	22-32	142	33.6
	33-42	147	34.8
	43-52	91	21.5
	53-62	34	8
	63-73	9	2.1
Experience	0-10	166	39.2
	11-20	129	30.5
	21-30	90	21.3
	31-40	32	7.6
	>41	6	1.4
Workplace	Private practice	281	66.4
	Public practice	50	11.8
	Private practice and public practice	31	7.3
	Professor and private practice	51	12.1
	Professor and public practice	5	1.2
	Professor, private practice and public practice	5	1.2
COVID-19	Were diagnosed with COVID-19 and were in domestic isolation	16	3.8
	Were hospitalized due to COVID-19	3	0.7
	Have had symptoms of COVID-19 but have not been tested to confirm	17	4
	Had symptoms of COVID-19	387	91.5
Work during pandemic	Limited activities only to urgent and emergency care	137	32.4
	Stopped all clinical activities	228	53.9
	Continued working normally	58	13.7
When started limiting activities	Between March 18th and April 1st	171	75
	Between 2 - 15 April	26	11.4
	Between 16 - 29 April	17	7.5
	Between April 30th and May 13th	6	2.6
	Between 14 – 27 May	3	1.3
	Between May 28th and June 10th	3	1.3
	Between 11 – 24 June	0	0
	Between June 25th and July 8th	2	0.9
How long limited activities	Between 1 - 2 weeks	17	7.5
	Between 2 - 3 weeks	25	11
	Between 3 - 4 weeks	23	10.1
	Between 4 - 5 weeks	18	7.9
	Between 5 - 6 weeks	18	7.9
	Between 6 - 7 weeks	9	3.9
	Between 7 - 8 weeks	13	5.7
	Between 8 - 9 weeks	8	3.5
	Between 9 - 10 weeks	8	3.5
	Between 10 - 11 weeks	1	0.4
	Between 11 - 12 weeks	12	5.3
	Between 12 - 13 weeks	5	2.2
	Between 13 – 14 weeks	4	1.7
	Between 14 - 15 weeks	8	3.5
	More than 15 weeks	59	25.9
When stopped activities	Between March 18th and April 1st	49	84.5
	Between 2 - 15 April	5	8.6
	Between 16 - 29 April	1	1.7
	Between April 30th and May 13th	0	0
	Between 14 – 27 May	1	1.7
	Between May 28th and June 10th	2	3.4
	Between 11 – 24 June	0	0

Source: Authors.

Setting of dental offices

Most of dentists are aware about the setting of dental office and are taking actions to prevent the transmission of the COVID-19 virus. Among the actions, most are doing a previous screening, spacing out clinical care, postponing care for the elderly, being more rigorous in terms of hand and office hygiene, improving ventilation and removing books, and decorative objects from the offices. The use of the triple syringe and the spitting bowl has been avoided and informational posters, delimitation of spaces and social distance are being instructed. On the other hand, telemonitoring is not in the daily practice of most of the volunteers, as well as the use of panoramic radiography despite the periapical and the measurement of people's temperature.

The responses regarding to the setting of dental offices are shown in Table 3.

Table 3: Setting of dental offices.

	No (%)	Yes (%)
Have you been screening patients over the phone prior to the appointment, especially for COVID-19?	38.5	61.5
Have you been providing more spaced appointments so that there is no crowding of patients in the waiting room?	6.3	93.7
Have you postponed treatments for elderly patients and / or those with systemic diseases?	21.8	78.2
Have you been washing and disinfecting your hands several times a day, more often than before the COVID-19 pandemic?	3.3	96.7
Have you been more rigorous in the disinfection and placement of protective barriers in the dental chair, benches, stool, high and low speed handpiece and other equipment?	6.1	93.9
Have you checked the patient's temperature before the appointment?	55.7	44.3
Have you checked the temperature of the entire work team?	60.5	39.5
Have you asked the patient to wash and / or disinfect the hands before starting the care?	27.3	72.7
Do you prohibit patients from entering the clinic if they are not wearing a mask?	10.4	89.6
Have you been avoiding the use of air conditioning and having frequent ventilation in the waiting room?	27.3	72.7
Did you get the books, magazines, newspapers and decorative objects out of the waiting room?	22.3	77.7
Did you take out decorative and non-essential objects for the care of the care room?	24.6	75.4
Have you kept your coats, bags and other personal items outside the waiting room or in closed cabinets?	21.8	78.2
Have you been instructing the patient not to bring a companion and, if he does, is he in the waiting room?	5.1	94.9
Do you use the patient's preoperative mouthwash with 1% hydrogen peroxide or 0.12-0.2% chlorhexidine or 0.2–1% povidone iodine?	32.9	67.1

Source: Authors.

Personal protective equipment during and after the pandemic period

Most of volunteers are using both permanent and disposable lab coat, disposable bouffant, both face mask and respirator, protective goggles, face shield, and are using procedure glove and sterile surgical glove only in surgeries. After the pandemic period, volunteers stated that will continue with the use of personal protective equipment, exception only to the use of the respirator.

Data regarding to the personal protective equipment are shown in Table 4.

Table 4: Personal protective equipment during and after the COVID-19 pandemic.

PPE	Answers	During	After
Lab cot	Only wear a lab coat	19.0	35.2
	Only wear disposable lab coat	17.7	14.7
	Wear both	62.8	49.9
	Do not wear lab coat	0.5	0.3
Bouffant	Only wear a fabric bouffant	8.6	13.2
	Only wear disposable bouffant	74.4	65.1
	Wear both	14.4	19.2
	Do not wear bouffant	2.3	2.5
nask protection	Use only respirator PFF or N95	27.1	14.7
	Use only disposable face mask	30.1	57.0
	Make use of both	42.5	28.1
	Do not use a face mask protection	0.3	0.3
tector or shoes for ive use in dental office	Yes	50.4	-
	No	49.6	-
ng shoe protector for exclusive use in tal office after pandemic	Yes	-	20
	No	-	44.8
	I don't use it during the pandemic	-	35.2
ective goggles	Yes	85.6	-
	No	14.4	-
using protective s after pandemic	Yes	-	14.7
	No	-	76.2
	I don't use it during the pandemic	-	9.1
face shield	Yes	86.8	-
	No	13.2	-
ng face shield after pandemic	Yes	-	34.4
	No	-	57.2
	I don't use it during the pandemic	-	8.4
Gloves	Use only procedure glove and sterile surgical glove only in surgeries	69.6	72.7
	Use only nitrile glove and sterile surgical glove only in surgeries	13.2	12.4
	Use only sterile surgical glove for all procedures, surgical or not	1.5	3.5
	Use only procedure glove for all procedures, surgical or not	12.2	8.1
	Use only nitrile glove for all procedures, surgical or not	3.3	3.3
	Do not use gloves	0.3	0

Source: Authors.

Changes in care in different dental specialties

Endodontics

Sixty volunteers were endodontists. Years of dental practice as specialist ranged from 0-42 years with a mean of 9.58 (SD 7.35) years.

A percentual of 48.33% of the professionals declared that the number of patients decreased during the pandemic period and they attribute this reduction to the financial crisis that the country is going through, to the social isolation that

encourages people to stay at home or to the fear of people being contaminated in the dental environment. In opposite, 30% observed an improvement in the number of patients, related to an increase in cases of pain and endodontic problems, which may be related to the stress caused by this period and fewer dentist attending. Only 21.67% claimed to be with the same flow of patients.

Changes in endodontics practice are related to perform coronary opening under rubber dam and to prioritize endodontic treatment in a single session. Volunteers reported increased office charges, but final price of patient continued the same.

Surgery, periodontology and implantology

Specialists in surgery totalized 10 volunteers, while periodontists were represented by 19 and implantodontists by 33. Years of dental practice as specialist ranged from 0-40 years with a mean of 11.16 (SD 7.74) years.

67.74% of the professionals stated that the number of patients reduced during the pandemic period and they attribute this reduction to the financial crisis that the country is going through, to the social isolation that encourages people to stay at home and to the fear of people being contaminated in the dental environment. Only 8.06% observed an increase in the number of patients; 24.19% claimed to be with the same flow of patients.

Periodontists are preferring the use of periodontal curettes instead of ultrasound or bicarbonate jet and hand instruments (e.g. chisel or bone file) instead of high-speed handpieces while both specialists in surgery and implants did not. Furthermore, both periodontists and implantodontists reduced the number of regenerative or ressective periodontal surgical procedures for therapeutic and aesthetic purposes. On the other hand, specialists in surgery are not preferring hand instruments instead of high-speed handpieces, did not reduced the number of regenerative or ressective surgical procedures. However, the number of orthognathic surgeries reduced as well installing dental implants.

Dental prosthodontics and operative dentistry

Specialists in prosthodontics totalized 34 volunteers, while specialists in operative dentistry were represented by 10. Years of dental practice as specialist ranged from 0-29 years with a mean of 10.86 (SD 7.83) years.

52.27% of the professionals stated that the number of patients reduced during the pandemic period and they attribute this reduction to the financial crisis that the country is going through, to the social isolation that encourages people to stay at home and to the fear of people being contaminated in the dental environment. 18.18% observed an increase in the number of patients; 29.55% claimed to be with the same flow of patients.

Most of prosthodontists and specialists in operative dentistry has not avoided strictly aesthetic procedures, nor has adopted the use of rubber dam in cases of tooth preparations that generate aerosol. Most of prosthodontists already had a protocol for decontamination of dental impression, model or services that were sent to the dental laboratory before the pandemic period. Among the professionals who did not have this protocol, only half adopted new protocols. Specialists in operative dentistry are not preferring atraumatic restorative treatment instead of the use of high-speed handpiece.

Orthodontists

Orthodontists was represented 58 volunteers. Years of dental practice as specialist ranged from 0-21 years with a mean of 7.75 (SD 6.47) years.

44.83% of the professionals stated that the number of patients reduced during the pandemic period and they attribute this reduction to the financial crisis that the country is going through, to the social isolation that encourages people to stay at

home and to the fear of people being contaminated in the dental environment. 17.24% observed an increase in the number of patients; 37.93% claimed to be with the same flow of patients.

Most of orthodontists are avoiding the use of ultrasound and bicarbonate jet. However, they are not avoiding the use of high-speed handpiece.

4. Discussion

Pandemic has persisted for more than a year and the proportion taken by COVID-19 is leaving the health system collapsed (Krishnan et al., 2021; WHO, 2021). The relevance of the present research was to observe that Brazilian dentists are aware of greater risk of infection, thus they are avoiding contagion through the correct setting of dental offices as well the correct use of personal protective equipment, which points to a shift to the post-pandemic period regarding to greater rigor in terms of biosafety.

It is well known that during the clinical practice, dental professionals are exposed to a large risk of infection by SARS-CoV-2 (Peng et al., 2020; Ahmed et al., 2020; Ather et al., 2020). In addition to the care of several patients, the access of the dentist directly to the upper airways and to salivary fluids in the form of aerosols - the main route of contamination of the Covid-19, the mucosa of the tongue may be an initial site of infection for SARS-CoV-2, that's why an early symptom of COVID-19 reported is loss of taste (Xu et al., 2020). Recent studies also reported that periodontal tissues and salivary grands can be source of saliva contamination by the virus (Fernandes Matuck et al., 2020; Matuck et al., 2021).

Thereby, the dentist and the dental office can become a cross contamination route for society (Ahmed et al., 2020; Melo Neto et al., 2020). This calls for greater preparation of the dentist community, especially regarding to the preparation of dental offices, more protective barriers and slight - but necessary - changes in dentistry procedures (Melo Neto et al., 2020; Vieira-Meyer et al., 2020).

However, it is extremely important maintain, if not improve, the oral hygiene during a pandemic period, because bacteria present in patients with severe COVID-19 are associated with the oral cavity (Sampson et al., 2020; González-Olmo et al., 2020). Visits in dentists can reduce the bacterial load in the mouth and the potential risk of a bacterial superinfection (Sampson et al., 2020). An important association between periodontitis and severity of COVID-19 infection was reported in a case–control study (Marouf et al., 2021). After evaluation of 568 patients, it was concluded that periodontitis was associated with 3.5 times greater risk of intensive care unit admission, 4.5 times greater need for assisted ventilation, and 8.8 times greater death (8.8 x) of COVID-19 patients, and with increased blood levels of biomarkers linked to worse disease outcomes (Marouf et al., 2021).

In the present study, it was observed that more than 50% of the volunteers limited their activities to attending only urgencies and emergencies and almost 14% stopped their activities, both for more than 15 weeks. Only 32% continue their activity as usually. This data is alarming and can lead us to the discussion whether the dental community knows about the importance of improving the oral health of the population in order to reduce the severity and spread of coronavirus. Therefore, there is a need for the federal and regional dentistry councils and the academic community to publicize the importance of the dentist's work in the pandemic.

Faced on the importance of contain contamination by COVID-19 among with the need to bring back/develop the oral health of patients through clinical dental care, standard daily protection measures in the dental clinic might not be sufficient (Meng et al., 2020). Therefore, the dentist must have the various precautions, which are better described in the literature (WHO, 2021; Meng et al., 2020; Ge et al., 2020; Samaranayake & Peiris, 2004; CDC, 2020; Al-Sehaibany, 2017).

According to the results of our study, Brazilian dentists are underestimating some points regarding to the setting of

dental offices. Temperature measurement of both patients and staff is not being performed for almost half of volunteers. During the pandemic it is recommended to measure and register the temperature of each patient as a routine procedure (Meng et al., 2020; Ge et al., 2020), because it can be an important symptom to be considered. Also, great part of the dentists is not avoiding the use of air conditioning and/or providing ventilation to the care room for at least 10 minutes after each patient (Meng et al., 2020; Ge et al., 2020).

Circulating the air is essential specially in spaces with aerosols (Ge et al., 2020). It is recommended to avoid or minimize the use of the triple syringe and periapical radiographs despite panoramic radiographs (Melo Neto et al., 2020). However, depending of procedure or dental specialty, more details must be observed and avoiding these procedures becomes extremely difficult. That's why an expressive part of the volunteers is not following these specific indications. Telemonitoring patients are encouraged, however it depends on the accessibility to the patient to internet and/or cell phones, which is still not a reality for many of them.

Coats, caps, respirators, gloves, shoe covers, protective glasses and/or face shields should be used to protect the skin and mucosa from potentially infected blood and secretions (Meng et al., 2020; Melo Neto et al., 2020; Al-Sehaibany, 2017). Volunteers are aware and have declared that they are using personal protective equipment, except for shoe cover. Almost half of participants declared not to use shoe protectors or shoes for exclusive use in the dental office.

For the post-pandemic period, almost 13% of the volunteers who is using both tissue and disposable coats currently, declared that will use only permanent coats. Also, the preference will be to the use of disposable face masks and 34% of the volunteers will stop using the face shield.

Acute apical abscess, symptomatic irreversible pulpitis, or dental traumatology are considered emergence treatments in Endodontics, and significant attention must be provided in these cases (Azim et al., 2020). Although authors have discussed the possibility to control pain with pharmacological in order to reduce the number of visits in dental offices (Ather et al., 2020; Azim et al., 2020), most cases should be treated immediately, therefore professionals must consider all patients as potentially infected and refold the aid (Ather et al., 2020; Yu et al., 2020).

In the present study, 30% of endodontists verified the improvement in the number of patients, mainly by pain. However, volunteers reported preventive measures to avoid the spread of the virus, such as their preference for longer single visits instead of multiple, avoiding successive visits to dental office and make the coronary access under rubber dam, which can reduce the aerosols in the atmosphere (Ather et al., 2020; Yu et al., 2020). These results corroborate with others described in the current literature (Ather et al., 2020; Yu et al., 2020).

In changes related to periodontal treatments, surgeries, or dental implants, reducing of elective treatments (such as dental implant installation, orthognathic surgery or regenerative therapies for aesthetic purposes) can be related to the patients being more conservative on spend money for fear of future financial crises. Other hypothesis is the need for hospitalization once there is not enough hospital beds to treat patients with COVID-19 complications and the higher contamination risk. Regarding the instruments used during pandemic in theses specialities, it can be explained once use of manual instruments is not always possible for teeth extraction and dental implant installation unlike periodontal treatments that can be performed using manual curettes. A previous investigation confirmed that periodontal procedures which generate aerosol (ultrasonic scaling, air polishing and prophylaxis) must be avoid reducing the amount and spread of contamination (Johnson et al., 2021). It was suggested a period of 30 to 60 minutes to aerosol settle and special care in cleaning around patient area and the equipment should be taken (Johnson et al., 2021).

Most of prosthodontists and operative dentistry did not adopted the use of rubber dam in cases of preparations that generate aerosol. As well reported, the sprays contaminated with respiratory or oral fluids is a risk factor to transmission of

COVID-19 (Sergis et al., 2021). The use of high-speed, the most used by prosthodontists and operative dentistry to tooth preparation, creates a fine-mist spray that spread at speeds of 12 m/s (Sergis et al., 2021). In order to avoid this contamination, the use of rubber dam – as barrier – in cases of tooth preparations may prevent the oral fluid mixing with the spray, consequently, could help to reduce the risk of contamination (Ather et al., 2020; Yu et al., 2020; Sergis et al., 2021).

Most orthodontists (55.17%) were not affected by the COVID-19 pandemic, since they claimed to be with the same flow of patients (37.93%) or they observed an increase in the number of patients (17.24%). Overall, orthodontic treatment lasts between 2 and 3 years, and some type of urgent treatment is usually necessary in about 85% of cases (Cotrin et al., 2020b). Problems involving orthodontic appliances or accessories, such as broken appliances, brackets, or tubes are the most common urgencies in orthodontics. If these are not resolved quickly, they can lead to prolonged treatment time, decreasing the patient's motivation, loss of the patient's confidence in the orthodontist, and sometimes causing injury to the patient (Cotrin et al., 2020b). It was showed that quarantine and pandemic impacted on the patients' anxiety and orthodontic appointments, treatment delay being the main concern (Cotrin et al., 2020a). In this way, the use of devices and techniques that require less scheduled appointments is recommended (García-Camba et al., 2020).

Orthodontists who observed a decrease in the number of patients (44.83%) during the pandemic period attributed this reduction to financial crisis, social isolation, and fear of contamination in dental environment. In order to reduce the infection risk, it is recommended to adopt measures of social distance by decreasing the number of patients and companions in clinics and redistributing spaces to respect safety distance, besides to stricter microbiological control protocols inside and outside the clinical area with increased use of personal protective equipment and reduction of procedures that produce aerosols (García-Camba et al., 2020). Most orthodontists reported avoiding the use of ultrasound and sodium bicarbonate jet, minimizing procedures that generate aerosols. However, they are not avoiding the use of high-speed handpieces, most of time essential for orthodontic care. In addition, for continuation of some orthodontic care tele-orthodontics can be used as a viable tool, especially in times of urgency (García-Camba et al., 2020; Saccomanno et al., 2020). However, this tool can be used even in normal times to reduce time and money spent, relieving the therapeutic demands for both orthodontist and patient, without significant loss of orthodontic quality (Saccomanno et al., 2020).

5. Conclusion

According to results obtained in this study, there was continuity of dental care, following the recommendations for safe care. There was a tendency for changes in relation to PPE to last after the end of the pandemic.

Conflict of Interest

The authors deny any conflict of interest.

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