Dental assistance for elderly during COVID-19 pandemic: A Brazilian perspective

Assistência odontológica para idosos durante a pandemia da COVID-19: Uma perspectiva brasileira

Atención odontológica para ancianos durante la pandemia de COVID-19: Una perspectiva brasileña

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Abstract
Aim: This study evaluated the need for dental assistance of elderly people during the COVID-19 outbreak. *Methodology:* This online observational survey included Brazilian elderly aged ≥ 60 years, with internet access from all Brazil's regions. They completed questionnaires regarding sociodemographic characteristics, general health, COVID fear (scale FCV-19S), and dental assistance. Data were tabulated and analyzed using descriptive and inferential analysis (α = 5%). *Results:* Overall, 705 elderly people completed the questionnaire. Most volunteers needed dental assistance (58.6%) although only 31.3% visited a dental office, reporting a dental urgency. Elderly had elective appointments (96.3%) in private dental services (95.9%), mostly accompanied during dental assistance (81.6%), without the need to wait (50.7%). Prosthodontic and restorative interventions were the most required procedures. In the dental office, the fear of being contaminated by COVID-19 existed in 53.9%, while the risk of being contaminated was considered medium (46%). Elderly from Northern, Northeastern, and Central-Western, with low educational level, previous COVID-19 diagnosis, and with highest FCV-19S scores had more fear of contamination in the dental office (all p <0.05). In Northern, Northeastern, and Southeastern Brazil, elderly with worse educational levels, and those with greatest FCV-19S scores (all p <0.05) considered the risk of being contaminated in dental offices. *Conclusions:* Finally, Brazilian elderly people still need dental assistance during the outbreak. Low-educational levels, previous COVID-19 diagnosis, fear of COVID-19, and highly affected Brazilian regions exhibited increased fear of being contaminated in the dental office, which may prevent them from seeking help.
Keywords: COVID-19; Dental care for aged; Dentistry.

Resumo
Objetivo: Avaliar a necessidade de atendimento odontológico de idosos durante a pandemia da COVID-19. *Metodologia:* Pesquisa observacional online que incluiu idosos brasileiros ≥ 60 anos, com acesso à internet em todas as regiões do Brasil. Foram respondidos questionários sobre características sociodemográficas, saúde geral, medo do

COVID-19 (escala FCV-19S) e assistência odontológica. Os dados foram tabulados e analisados por meio de análise descritiva e inferencial (α = 5%). *Resultados:* Ao todo, 705 idosos responderam ao questionário. A maioria necessitou de atendimento odontológico (58,6%), embora apenas 31,3% tenham procurado um consultório, relatando urgência. Idosos realizaram consultas eletivas (96,3%) em serviços odontológicos privados (95,9%), e em sua maioria estavam acompanhados durante o atendimento odontológico (81,6%), sem necessidade de espera (50,7%). As intervenções protéticas e restauradoras foram as mais solicitados. No consultório odontológico, 53,9% relataram medo de ser contaminado por COVID-19, sendo este risco considerado médio (46%). Idosos das regiões Norte, Nordeste e Centro-Oeste, com baixa escolaridade, diagnóstico prévio de COVID-19 e maiores escores no FCV-19S tiveram mais medo de contaminação em consultório odontológico (todos p <0,05). Nas regiões Norte, Nordeste e Sudeste do Brasil, idosos com piores níveis de escolaridade e aqueles com maiores escores no FCV-19S (todos p <0,05) concordaram com o risco de contaminação em consultórios odontológicos. *Conclusões:* Idosos brasileiros ainda precisam de atendimento odontológico durante a pandemia. Aqueles com baixa escolaridade, diagnóstico prévio da doença, medo da COVID-19 e de regiões brasileiras altamente afetadas apresentaram maior medo de serem contaminados no consultório odontológico, o que pode impedi-los de procurar ajuda.
Palavras-chave: COVID-19; Assistência odontológica para idosos; Odontologia.

Resumen

Objetivo: Evaluar la necesidad de atención dental de ancianos durante la pandemia de COVID-19. Metodología: Estúdio observacional on-line que incluyó a ancianos brasileños ≥ 60 años, con acceso a internet de todas las regiones de Brasil. Ellos completaron cuestionarios sobre características sociodemográficas, salud general, miedo a COVID (escala FCV-19S) y atención dental. Los datos se tabularon y analizaron mediante análisis descriptivo e inferencial (α = 5%). *Resultados*: En total, 705 ancianos completaron el cuestionario. La mayoría necesitan atención dental (58,6%), aunque que 31,3% visitó un consultorio, informando urgencia dental. Los ancianos tenían consultas electivas (96,3%) en servicios odontológicos privados (95,9%), mayoritariamente acompañados (81,6%), sin necesidad de esperar (50,7%). Las intervenciones de prótesis y restauración fueron los procedimientos más requeridos. El miedo a contaminarse por COVID-19 em consultório odontológico existía en el 53,9%, mientras que el riesgo de contaminarse se consideraba medio (46%). Ancianos del norte, noreste y centro-oeste, con bajo nivel educativo, diagnóstico previo de COVID-19 y con puntajes más altos de FCV-19S, tenían más miedo a la contaminación en el consultorio dental (todos p <0.05). En el norte, noreste y sureste de Brasil, los ancianos con peores niveles educativos y aquellos con mayores puntajes FCV-19S (todos p <0.05) consideraron el riesgo de contaminarse en los consultorios dentales. Conclusiones: Ancianos brasileños necesitan atención dental durante la pandemia. Bajos niveles educativos, diagnóstico previo de COVID-19, miedo al COVID-19 y regiones brasileñas altamente afectadas mostraron un mayor temor a contaminarse en el consultorio dental, lo que puede evitar que busquen ayuda.
Palabras clave: COVID-19; Cuidado dental para ancianos; Odontología.

1. Introduction

The last epidemiological surveillance report about COVID-19, from February 2021, ranked Brazil (*Brasil. Ministério Da Saúde. Conselhos Nacionais de Secretários de Saúde. Painel CONASS COVID-19*, 2020) in the third position of cumulative confirmed cases (10,517,232), after the United States (28,554,465) and India (11,096,731); and the second country with the highest cumulative number of confirmed deaths (254,221). These statistics reveal an uncontrolled infection worldwide after a year of strict measures to intensify the SARS-CoV-2 control, including lockdown periods, social distance, and hygiene protocols (American Dental Association, 2020; World Health Organization, 2002). Nonetheless, healthcare providers keep working and assisting people of all ages, which amplifies the contact between symptomatic and asymptomatic individuals and increases contamination (Meng et al., 2020).

Within this context, dental services have undergone important challenges in the clinical and educational spheres (Barbieri et al., 2019; Coulthard, 2020; Meng et al., 2020) to restrain the SARS-CoV-2 spread. Dental clinics are still high-risk environments for contamination and infection of health professionals and patients (Barbieri et al., 2019; Khanagar et al., 2021). The presence of body fluids during dental treatment, such as blood and saliva, and the aerosols generated due to the use of rotating and ultrasonic equipment types are vehicles for SARS-CoV-2 contamination (Barbieri et al., 2019; Meng et al., 2020). Effective protocols have pointed to the use of particulate respirators (N95 or FFP-2 masks), hand hygiene, thorough surface

cleaning, 4-handed technique, saliva ejectors, and preoperative antimicrobial mouth rinses to minimize the virus exposure (Ge et al., 2020; Meng et al., 2020; Passarelli et al., 2020; Siles-Garcia et al., 2020; Spagnuolo et al., 2020).

Although no cases of COVID-19 transmission have been reported in the dental settings (Ge et al., 2020), there is a need for dental care to elderly people, considering high rates of tooth loss and periodontal disease (*Brasil. Ministério Da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010*, 2012). The last Brazilian epidemiological survey on oral health identified that most elderly had teeth absences and needed prosthetic rehabilitation in one or both dental arches (*Brasil. Ministério Da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010*, 2012). The consequences of poor oral health is well-known to affect functional, physical, social and psychological aspects of life. Notwithstanding, age is the most significant risk factor for the increased susceptibility of the COVID-19 severe form and death among older patients due to impairment of immune-response, dealing with cytokines storm, and the inflammaging (Perrotta et al., 2020). Although elderly have shown high fatality rates by the SARS-CoV-2 virus (Zhou et al., 2020), especially those with underlying diseases, they still need periodic assistance from dental practitioners. Thus, the frequent need for oral health care associated with isolation and social distance, inherent to the pandemic, also increases the concerns with the virus disease in this age group.

Despite the importance of the topic, no studies have assessed the relevance of dental assistance for elderly during the pandemic and their feelings towards dental treatment. Thus, this online observational survey was conducted with Brazilian elderly people to evaluate the need for dental assistance during the COVID-19 outbreak, as an effort to detect major causes for seeking dental care and to provide Brazilian health professionals with the best perspective of care for these patients during pandemic. Moreover, the fear and the risk of being contaminated in the dental office were also verified.

2. Methodology

Study design and sample

This study was performed using the Google Forms platform (Google LLC, Mountain View, CA, USA). Sociodemographic characteristics, general health data, previous diagnosis of COVID-19, and COVID-19 Fear Scale were the independent variables. The fear and risk of being contaminated by COVID-19 were the dependent variables and belonged to a questionnaire including dental assistance needs during the pandemic. The association between dependent and independent variables was assessed.

The sample size estimation considered the total elderly population per Brazilian region (Instituto Brasileiro de Geografia e Estatística (IBGE), 2019). Sample calculation was performed considering the independent variable "Fear of COVID-19 Scale" (power of 80% and a response rate of 80%), a sample loss of 20%, a study design effect of 2.0, and a 95% of confidence level). Seeing that 17.7% of participants answered the first question of COVID-19 Fear Scale (FCV-19S) (Ahorsu et al., 2020; Cavalheiro & Sticca, 2020) as "very much afraid of COVID-19", a total of 560 Brazilian elderly were needed to detect significant differences. Elderly aged 60 years or more who have internet access from all Brazilian regions were included. Consequently, those unable to answer the online research questionnaire were not considered in the study.

To announce this research, an online hyperlink was broadcast on social media (Facebook and Instagram pages), as well as by written (Brazilian local newspaper) and spoken press advertisement (local journalistic TV and radio programs). After, a total of 705 elderly people could access and sign the Informed Consent Form approved by the Ethics Committee of Piracicaba Dental School, University of Campinas, Brazil, under protocol #35613720.1.0000.5418. After consenting to the research, elderly had access to the online questionnaire.

To answer all questions and during the use of digital devices, relatives and acquaintances could help elderly fill out the online forms, when necessary, as long as the answers provided the elderly's actual situation and needs. Sociodemographic

and general health data, COVID-19 fear, and demand for dental assistance during the pandemic were asked and had to be completed from September to December 2020. Incomplete or inconsistent data were excluded during descriptive and inferential analysis.

Socioeconomic and general health data

The socioeconomic data and general health information were collected in the research form. The former included questions regarding age, gender, region of residence, marital status, educational level, monthly income, address changes during the pandemic, and types of media used to get informed about pandemic. The latter consisted of multiple-choice questions of general health: mobility, quarantine habits, COVID-19 signs, symptoms, or previous diagnosis, presence of underlying comorbidities, smoking habits, height, weight, and medication use.

COVID-19 fear scale

The COVID-19 fear was assessed by the Brazilian version of the FCV-19S (Ahorsu et al., 2020; Cavalheiro & Sticca, 2020). This instrument consisted of seven questions with five answer options in the Likert scale (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; and 5 = strongly agree) (Ahorsu et al., 2020). After adding the answers' scores to each question, the total score would range from 7 to 35 points (Ahorsu et al., 2020). Therefore, the higher the questionnaire's total score, the greater the individual's fear of SARS-CoV-2 (Ahorsu et al., 2020).

Dental assistance during the pandemic

Questions regarding dental assistance during the pandemic comprised the need and reasons for seeking dental assistance. In addition, the type of dental service (public or private services), whether elective dental procedures or not, whether accompanied or not, type of dental treatment performed, fears and feelings regarding dental assistance, and risk of being contaminated during the pandemic scenario were also inquired.

Data analysis

Poisson Regression analysis was used to verify the association between fear and risk of being contaminated by COVID-19 during dental assistance (dependent variables) and sociodemographic characteristics, comorbidities, previous diagnosis of COVID-19, and FCV-19S (independent variables). The independent variables were ranked into three blocks, from the most distal to the most proximal. Block 1 included sociodemographic characteristics such as age, gender, Brazilian regions, and educational level. Block 2 comprised comorbidities (diabetes, hypertension, heart disease, respiratory disease, kidney disease, cancer, stroke, obesity). And block 3 included the previous diagnosis of COVID-19 and FCV-19S data.

In the Backward procedure's crude model, variables that reached a p-value <0.20 were covered in the adjusted model. The regression coefficient (B), prevalence ratio (PR), and confidence intervals (95% CI) measures were obtained. Data was collected and analyzed through SPSS software (SPSS for Windows, version 20.0, SPSS Inc, Chicago, IL, USA) and p-values <0.05 were statistically significant.

3. Results

Table 1 highlights data (number and frequency) about elderly dental assistance during the pandemic. Almost 60% of the elderly people reported the need to visit a dentist during the pandemic, although only 31.3% went to the dental office. From those, more than half (53%) reported having a dental urgency. Besides, most elderly look for elective appointments (96.3%) in private dental services (95.9%). During dental assistance, elderly people were accompanied (81.6%) and waited in reception rooms (47%) or did not need to wait (50.7%).

Table 1. Characterization of dental care in Brazil during the COVID-19 pandemic.

| Variables	n	%
Need to go to the dentist (n=705)		
Yes	413	58.6
No	292	41.4
Went to the dental office during the pandemic (n=705)		
Yes	221	31.3
No	484	68.7
Reasons to go to the dentist (n=217)		
Proceed with the treatment	54	24.9
Urgency	115	53.0
Routine consultation	21	9.7
Other reasons	27	12.4
Was attended (n=221)		
Yes	217	98.2
No	4	1.8
Type of dental service (n=217)		
Public service	9	4.1
Private service	208	95.9
Accompanied (n=217)		
Yes	177	81.6
No	40	18.4
Elective appointment (n=217)		
Yes	209	96.3
No	8	3.7
Where you waited for the assistance (n=217)		
Reception	102	47.0
Open-air	5	2.3
No need to wait	110	50.7

Source: Personal archives (2021).

Regarding dental procedures during the COVID-19 pandemic, 81.6% consisted of interventions, followed or not by prescription (Table 2). Prosthodontic and restorative interventions have been frequently performed (Figure 1).

Table 2. Frequency of dental procedures during the COVID-19 pandemic.

Variables	n	%
Dental procedures (n=705)		
Prescription	2	0.9
Intervention	177	81.6
Prescription and intervention	38	17.5
Prosthetic intervention (n=215)		
Yes	79	36.7
No	136	63.3
Restorative intervention (n=215)		
Yes	107	49.8
No	108	50.2
Periodontal intervention (n=215)		
Yes	55	25.6
No	160	74.4
Endodontic intervention (n=215)		
Yes	17	7.9
No	198	92.1
Surgical intervention (n=215)		
Yes	22	10.2
No	193	89.8

Source: Personal archives (2021).

Figure 1. Frequency of dental procedures carried out during the COVID-19 pandemic for Brazilian elderly people.
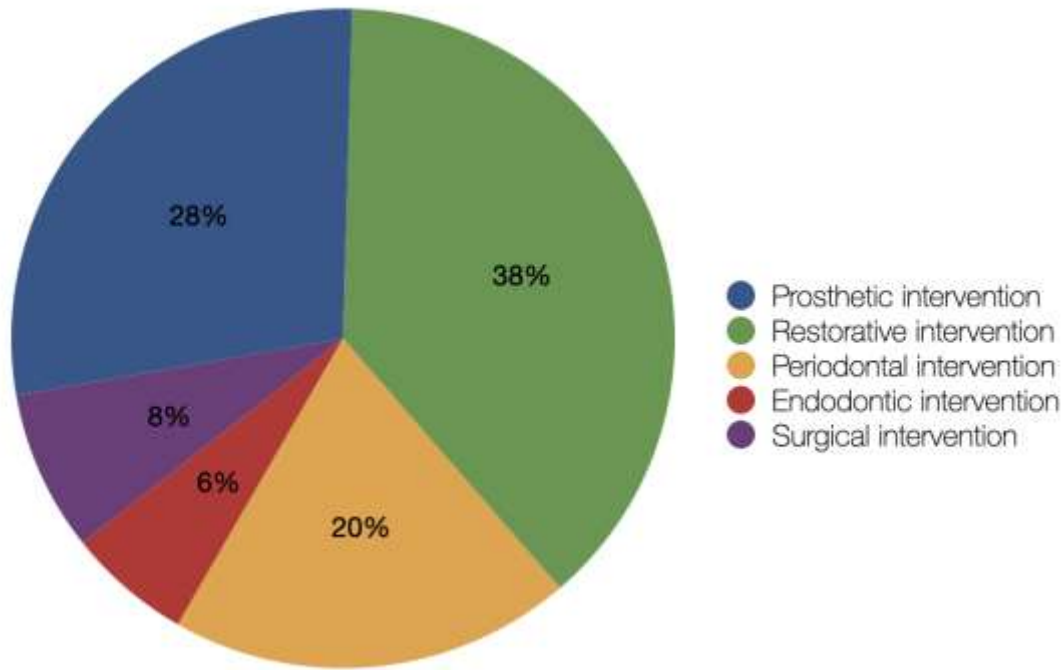
Source: Personal archives (2021).

The fear of being contaminated by COVID-19 and the risk of being contaminated by COVID-19 in a dental office are displayed in Table 3. Even though 53.9% of elderly people reported not being afraid of the virus contamination within the dental office, 64.5% agreed with the risk of being contaminated in this ambiance. The self-perception about the risk level of being contaminated was medium (46%) to high (37.2%).

Table 3. Frequencies of fear of being contaminated by COVID-19 and risk of being contaminated by COVID-19 in the dental office according to Brazilian elderly.

Variables	n	%
Fear of being contaminated by COVID-19 in the dental office (n=705)		
Yes	325	46.1
No	380	53.9
Risk of being contaminated by COVID-19 in the dental office (n=705)		
Yes	455	64.5
No	250	35.5
Risk level of being contaminated by COVID-19 in the dental office (n=446)		
Low	75	16.8
Medium	205	46.0
High	166	37.2

Source: Personal archives (2021).

Table 4 shows the association of the fear to be contaminated by COVID-19 and the Brazilian elderly sociodemographic data. It can be noted that the fear of being contaminated during dental assistance was associated with Northern (p=0.018), Northeastern (p=0.001), and Central-Western (p=0.048) regions of Brazil; low educational level (elementary school) (p=0.033); previous COVID-19 diagnosis (p=0.001); and, with highest scores in the FCV-19S (p=0.000).

Table 4. Poisson Regression analysis for factors associated with fear of being contaminated by COVID-19 in the dental office according to Brazilian elderly people (n= 702).

Variables	p-value	PR	95% CI	
			Lower	Upper
Gender				
Female	0.094	0.955	0.904	1.008
Male		Ref		
Region of Brazil				
North	0.018*	0.875	0.783	0.977
Northeast	0.001*	0.894	0.836	0.956
Southeast	0.081	0.953	0.903	1.006
Central-West	0.048*	0.905	0.820	0.999
South		Ref		
Educational level				
Elementary school	0.033*	1.090	1.007	1.181
High school	0.734	0.989	0.926	1.056
Graduate	0.306	0.970	0.916	1.028
Postgraduate		Ref		
Previous COVID-19 diagnosis				
Yes	0.001*	1.128	1.052	1.210
No		Ref		
COVID-19 Fear Scale	0.000*	0.983	0.979	0.987

Note: B: Regression Coefficient; PR: Prevalence Ratio; 95% CI: 95% Confidence Interval; Ref: Reference category used in the Poisson Regression; *p-value < 0.05 was considered statistically significant. Source: personal archives (2021).

The Poisson Regression model results adjusted for the factors associated with the risk of contracting COVID-19 in the dental office can be verified in Table 5. Elderly people living in Northern, Northeastern, and Southeastern Brazil compared to Southern elderly residents, believe more often in the risk of contracting COVID-19 during dental assistance. In addition, a

worse educational level is associated with the perceived risk of contracting COVID-19 at the dentist (p <0.05). The greatest FCV-19S score was also associated with the belief that there is a risk of contracting COVID-19 in the dental office (p <0.05).

Table 5. Poisson Regression analysis for the factors associated with the risk of being contaminated by COVID-19 in the dental office according to Brazilian elderly people (n=702).

Variables	p-value	PR	95% CI	
			Lower	Upper
Region of Brazil				
Northern	0.009*	0.854	0.758	0.961
Northeastern	0.002*	0.889	0.826	0.956
Southeastern	0.010*	0.921	0.865	0.980
Central-Western	0.149	0.926	0.834	1.028
Southern		Ref		
Educational level				
Elementary school	0.045*	1.098	1.002	1.203
High school	0.481	1.026	0.955	1.102
Graduate	0.158	0.956	0.898	1.018
Postgraduate		Ref		
Previous COVID-19 diagnosis				
Yes	0.117	0.930	0.849	1.018
No		Ref		
COVID-19 Fear Scale	0.000*	0.982	0.978	0.986

Note: B: Regression Coefficient; PR: Prevalence Ratio; 95% CI: 95% Confidence Interval; Ref: Reference category used in the Poisson Regression; *p-value < 0.05 was considered statistically significant. Source: Personal archives (2021).

4. Discussion

COVID-19 collateral effects have impaired people of all ages. However, dental treatment for the elderly in this period has been a challenge, once dental assistance requires face-to-face contact, raising the risk of SARS-CoV-2 contamination (Meng et al., 2020). This study attempted to verify the needs for dental assistance during the pandemic by Brazilian elderly people, and make dentists aware of the most performed procedures, to better follow the biosafety protocols and optimize patient care.

Although more than half of the Brazilian elderly reported the need for dental assistance during the pandemic, a small percentage went to the dental office. At the beginning of the pandemic, a reduction of 38% of patient's visits to a Chinese dental emergency service was observed (Guo et al., 2020). Dental services were affected negatively by the pandemic, enhancing patients' worries about the potential risk of COVID-19 contamination in a crowded environment, as in a dental hospital (Jiang et al., 2020). In contrast, findings from Brazilian dentists showed massive elective dental visits of adults to perform prophylaxis, restorative and esthetic procedures, contradicting quarantine recommendations to stay at home (Faccini et al., 2020). Although our study was the first conducted with elderly population on the pandemic dental assistance needs, the scenario reflects elderlies' fear about the disease's consequences. A useful and recent alternative to minimize unnecessary travels and provide oral health care to the elderly has been teledentistry, a novel way to contact patients using technology and telecommunications (Aquilanti et al., 2020).

Urgent dental procedures were the primary treatment during the pandemic. In Brazil, the Federal Council of Dentistry followed the guidance of The American Dental Association released in March 2020 (American Dental Association, 2020), to define dental emergencies and nonemergency procedures for dental professionals and patients during the pandemic. Dental emergencies comprise the treatment of potential threats to the patient's lives, while urgent procedures refer to the relief of pain or infection (American Dental Association, 2020). Dentists were recommended to postpone elective schedules and prioritize urgent procedures (American Dental Association, 2020; Spagnuolo et al., 2020). In Brazil, 64.5% of the dentists attended urgent and emergent cases and only 9.3% closed the dental clinics during the pandemic (Faccini et al., 2020). As most dentists denied ADA recommendations, orthodontic, prosthetic, restorative procedures, dental-pulp infections, and cellulitis treatments counted for most of the reported dental urgencies (Faccini et al., 2020; Guo et al., 2020; Jiang et al., 2020). Elderlies' concerns about the availability of dental care may explain the need to have urgent dental assistance during the pandemic. Besides, the uncertainties about economic conditions during and after the pandemic possibly prevented dentists from stopping the assistance.

Contrasting the previous outcome, most elderly who seek dental treatment on pandemic were attended in an elective consultation in private clinics. Even though elderly classified their dental procedures as urgent needs, it is clear that the differences between urgency, emergency, and nonurgency (or elective) are not evident. In China, accessing urgent and emergent dental services is convenient compared to elective procedures, regardless of dental fees (Guo et al., 2020), explaining the enhanced number of adults in emergency centers. In the United States, 70% of elderly lack health insurance and do not use dental services (Raphael, 2017). Differently, all Brazilians have access to the free Brazilian National Health System (SUS). Even though most elderly reported going to a private dental service (*Brasil. Ministério Da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010*, 2012), no recent studies have shown the same pattern in Brazil during the pandemic. Thus, we speculate an increased dental assistance demand for elderly in the SUS during the outbreak that, associated with fear of COVID-19 contamination, led families to uphold elderly assistance in private clinics.

Elderly people were accompanied during dental visits and promptly attended by the dentist without waiting or had to wait at reception. In accordance with our outcomes, authors recommended reducing the number of patients coming to dental clinics, having fewer in the waiting room (Passarelli et al., 2020), social distancing of at least one meter between patients (Bhanushali et al., 2020; Ge et al., 2020), waiting outside or in a vehicle for a telephone contact, and avoiding companions to the appointments (Bhanushali et al., 2020). Waiting rooms with adequate ventilation were also set as a recommendation to dental settings (Ge et al., 2020). Considering elderly who participated in this study, having an acquaintance companion on dental assistance is sometimes required due to the elderlies' underlying comorbidities and level of dependence. It emphasizes that healthcare professionals may adjust the scheduled appointments and the biosafety protocols in this period.

Restorative and prosthetic interventions were the most executed dental procedures during the pandemic, with or without prescription to elderly people. Regardless of pandemic, Brazilian elderly used to seek dental assistance in SUS as a routine treatment or to have a tooth extracted (*Brasil. Ministério Da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010*, 2012). Literature findings in the adult population shows increased dental pulp or periapical lesions, and oral infections problems during the pandemic (Guo et al., 2020). Dental specialists decided to keep dental assistance during the pandemic and found toothache, broken restoration, and dental trauma as the leading causes of dental urgencies (Faccini et al., 2020). Nonetheless, the oral condition of Brazilian elderly people is poor, including dental caries, periodontal disease, teeth absences, need for prostheses, or old restorations (*Brasil. Ministério Da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010*, 2012), leading to fractures, replacement, or new dental procedures. As an attempt to avoid worsening of clinical conditions or triggering inflammatory or infectious processes, elderly decided to have dental procedures performed during the pandemic.

Nearly half of elderly are not afraid of being contaminated by COVID-19 in the dental office, but the majority agree with medium to high risk of contamination. Most adults worried a little about the risk of COVID-19 infection and believe there is a moderate risk of infection in a dental visit (Jiang et al., 2020), supporting our findings. Adopting biosafety protocols to prevent virus contamination is essential in light of the high-risk complications of SARS-CoV-2 in elderly people (Zhou et al., 2020). For these reasons, dentists have included various and new preventive measures in daily practice, such as EPA filters, patient screening, disinfection stations, thorough surfaces cleaning, respirators, face shields and goggles, mouth rinses before procedures, saliva ejectors, extraoral radiographs, and reduced production of droplets and aerosol (Ge et al., 2020; Meng et al., 2020; Passarelli et al., 2020; Siles-Garcia et al., 2020; Spagnuolo et al., 2020). Elderly may feel safe with new biosafety measures adopted by dentists and, due to the need for care, many will put aside their fear to resolve dental problems, even assuming a risky attitude in this period.

Regarding the regression analysis, fear of being contaminated by COVID-19 in the dental office was prevalent in Northern, Northeastern, and Central-Western Brazil. Up to date, nearly 295,425 deaths and 12,047,526 confirmed cases have been reported in Brazil, representing a mortality rate of 2.5% (*Brasil. Ministério Da Saúde. Conselhos Nacionais de Secretários de Saúde. Painel CONASS COVID-19*, 2020). Of these numbers, the highest mortality rates/100,000 residents are in Northern (167.7), Central-Western (162.6), and Southeastern (149.2) Brazil, while Southern (139.4) and Northeastern (122.9) Brazil are the lowest. Even with the outrageous COVID-19 deaths, young Brazilian dentists from low affected regions by coronavirus kept their dental routine without concern about dental treatments and oral health conditions of their patients (Faccini et al., 2020). This fact does not seem to match those findings of fear of being contaminated between elderly previously diagnosed with COVID-19 and those with high scores in FCV-19S. However, they are probably explained by the imperative need elderly feel to solve dental problems. Moreover, low educational levels have also influenced the fear of being contaminated in the dental office. Being elderly and having a low educational level are determinants of adverse psychological outcomes, such as anxiety, stress, fear and panic, pronounced during an outbreak (Perrin et al., 2009). Consequently, these emotions may drive the fear of being contaminated, explaining the outcomes.

Meanwhile, the risk of being contaminated by COVID-19 in the dental office was similar in Brazilian regions, except for the Central-Western Brazil, given way to Southeastern compared to the Southern, and the previous diagnosis of COVID-19, that did not show differences. Both Central-Western and Southeastern people exhibit high COVID-19 confirmed cases and deaths (*Brasil. Ministério Da Saúde. Conselhos Nacionais de Secretários de Saúde. Painel CONASS COVID-19*, 2020). However, when this study was conducted (September to December 2020), these countings were probably the highest in Southeastern, Northern and Northeastern. Currently, the media (March 2021) reports an overload of intensive care units in

Southern Brazil. As the numbers of COVID-19 cases change overtime, elderly from highly affected or densely inhabited regions may show greatest concerns and consciousness with disease transmissibility.

It is important to emphasize that this online research design has some drawbacks mainly for using in the elderly population. Thus, online survey questionnaires for elderly population may increase participant bias inherent to accessing, filling, and understanding the questions. Besides, as the inclusion criterion involved only elderly people with internet access (only 37.8% of Brazilian elderly) (Instituto Brasileiro de Geografia e Estatística (IBGE), 2019), this can be considered as a source of bias, and data should be interpreted with caution. Thus, further studies including the less favorable elderly people in Brazil are needed.

The continuing progress of SARS-CoV-2 transmissibility, and the governmental flaws in pandemic control in low-income countries, as in Brazil, have evoked discussions and updates in multiple platforms (*Brasil. Ministério Da Saúde. Boletins Epidemiológicos Coronavírus.*, 2021; *Brasil. Ministério Da Saúde. Conselhos Nacionais de Secretários de Saúde. Painel CONASS COVID-19*, 2020). Thus, the use of teledentistry to treat urgent and nonurgent dental assistance, may be advantageous for institutionalized and community-dwelling elderly (Aquilanti et al., 2020; Bhanushali et al., 2020) during pandemic periods.

5. Conclusions

Most Brazilian elderly people need dental assistance during COVID-19 outbreak, especially for restorative and prosthetic procedures. However, less than half of elderly seek dental treatment due to fear of being contaminated by the virus. Private clinics offered elective services following biosafety measures. Moreover, elderly with low-educational level, previous COVID-19 diagnosis, fear of COVID-19, and those from highly affected regions of Brazil exhibited fear of being contaminated in the dental office, classifying it as a medium to high risk.

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Conflict of interest

Authors declare no conflict of interest.

Ethics Statement

This study had been assessed by the Ethics Committee from Piracicaba Dental School, through the number #35613720.1.0000.5418 and all procedures were in accordance with the Declaration of Helsinki.

References

Ahorsu, D. K., Lin, C.-Y., Imani, V., Saffari, M., Griffiths, M. D., & Pakpour, A. H. (2020). The Fear of COVID-19 Scale: Development and Initial Validation. *International Journal of Mental Health and Addiction*.

American Dental Association. (2020). Summary of ADA guidance during the COVID-19 crisis. *Ada*, 19–20. https://www.ada.org/en/press-room/news-releases/2020-archives/april/summary-of-ada-guidance-during-the-covid-19-crisis?utm_source=mouthhealthy&utm_medium=covid-19-mh&utm_content=cv-gov—interim-statement&utm_campaign=covid-19

Aquilanti, L., Santarelli, A., Mascitti, M., Procaccini, M., & Rappelli, G. (2020). Dental Care Access and the Elderly: What Is the Role of Teledentistry? A Systematic Review. *International Journal of Environmental Research and Public Health*, *17*(23), 9053.

Barbieri, A. A., Feitosa, F., Ramos, C. J., & Teixeira, S. C. (2019). Biosafety measures in dental practice: Literature review. *Brazilian Dental Science*, *22*(1), 9–16.

Bhanushali, P., Katge, F., Deshpande, S., Chimata, V. K., Shetty, S., & Pradhan, D. (2020). COVID-19: Changing Trends and Its Impact on Future of Dentistry. *International Journal of Dentistry*, *2020*, 1–6.

Brasil. Ministério da Saúde. Boletins Epidemiológicos coronavírus. (2021). https://coronavirus.saude.gov.br/boletins-epidemiologicos

Brasil. Ministério da Saúde. Conselhos Nacionais de Secretários de Saúde. Painel CONASS COVID-19. (2020). https://www.conass.org.br/painelconasscovid19/

Brasil. Ministério da Saúde. SB Brasil 2010: Pesquisa Nacional de Saúde Bucal SB BRASIL 2010. (2012).

Cavalheiro, F. R. S., & Sticca, M. G. (2020). Adaptation and Validation of the Brazilian Version of the Fear of COVID-19 Scale. *International Journal of Mental Health and Addiction*.

Coulthard, P. (2020). Dentistry and coronavirus (COVID-19) - moral decision-making. *British Dental Journal*, *228*(7), 503–505.

Faccini, M., Ferruzzi, F., Mori, A. A., Santin, G. C., Oliveira, R. C., Oliveira, R. C. G. de, Queiroz, P. M., Salmeron, S., Pini, N. I. P., Sundfeld, D., & Freitas, K. M. S. (2020). Dental Care during COVID-19 Outbreak: A Web-Based Survey. *European Journal of Dentistry*, *14*(S 01), S14–S19.

Ge, Z., Yang, L., Xia, J., Fu, X., & Zhang, Y. (2020). Possible aerosol transmission of COVID-19 and special precautions in dentistry. *Journal of Zhejiang University-SCIENCE B*, *21*(5), 361–368.

Guo, H., Zhou, Y., Liu, X., & Tan, J. (2020). The impact of the COVID-19 epidemic on the utilization of emergency dental services. *Journal of Dental Sciences*, *15*(4), 564–567.

Instituto Brasileiro de Geografia e Estatística (IBGE). (2019). *Pesquisa Nacional por Amostra de Domicílios Contínua - PNAD*. https://www.ibge.gov.br/estatisticas/sociais/populacao/17270-pnad-continua.html?edicao=30362&t=o-que-e

Jiang, Y., Tang, T., Mei, L., & Li, H. (2020). COVID-19 affected patients' utilization of dental care service. *Oral Diseases*, 0–3.

Khanagar, S. B., Al-Ehaideb, A., Vishwanathaiah, S., Maganur, P. C., Naik, S., & Siddeeqh, S. (2021). Exposure Risks and Preventive Strategies Considered in Dental Care Settings to Combat Coronavirus Disease (COVID-19). *HERD: Health Environments Research & Design Journal*, *14*(1), 278–289.

Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus Disease 2019 (COVID-19): Emerging and Future Challenges for Dental and Oral Medicine. *Journal of Dental Research*, *99*(5), 481–487.

Passarelli, P. C., Rella, E., Manicone, P. F., Garcia-Godoy, F., & D'Addona, A. (2020). The impact of the COVID-19 infection in dentistry. *Experimental Biology and Medicine*, *245*(11), 940–944.

Perrin, P. C., McCabe, O. L., Everly, G. S., & Links, J. M. (2009). Preparing for an influenza pandemic: Mental health considerations. *Prehospital and Disaster Medicine*, *24*(3), 223–230.

Perrotta, F., Corbi, G., Mazzeo, G., Boccia, M., Aronne, L., D'Agnano, V., Komici, K., Mazzarella, G., Parrella, R., & Bianco, A. (2020). COVID-19 and the elderly: insights into pathogenesis and clinical decision-making. *Aging Clinical and Experimental Research*, *32*(8), 1599–1608.

Raphael, C. (2017). Oral Health and Aging. *American Journal of Public Health*, *107*(S1), S44–S45.

Siles-Garcia, A. A., Alzamora-Cepeda, A. G., Atoche-Socola, K. J., Peña-Soto, C., & Arriola-Guillén, L. E. (2020). Biosafety for dental patients during dentistry care after COVID-19: A review of the literature. *Disaster Medicine and Public Health Preparedness*, 1–6.

Spagnuolo, G., De Vito, D., Rengo, S., & Tatullo, M. (2020). COVID-19 Outbreak: An Overview on Dentistry. *International Journal of Environmental Research and Public Health*, *17*(6), 2094.

World Health Organization. (2002). *The world health report 2002 - Reducing Risks, Promoting Healthy Life.* https://www.who.int/whr/2002/en/

Zhou, P., Yang, X.-L., Wang, X.-G., Hu, B., Zhang, L., Zhang, W., Si, H.-R., Zhu, Y., Li, B., Huang, C.-L., Chen, H.-D., Chen, J., Luo, Y., Guo, H., Jiang, R.-D., Liu, M.-Q., Chen, Y., Shen, X.-R., Wang, X., & Shi, Z.-L. (2020). A pneumonia outbreak associated with a new coronavirus of probable bat origin. *Nature*, *579*(7798), 270–273.