

Original Research Article

Actions about covid-19 among dentists during the first wave of the pandemic: a cross-sectional survey

Maria Fernanda Pivetta Petinati²
Giselle Emilãine da Silva Reis¹
Katheleen Miranda dos Santos²
Jennifer Tsi Gerber²
Alice Vanzela Miotto
Tatiana Miranda Deliberador²
Juliana Feltrin de Souza¹
Nelson Luis Barbosa Rebellato¹
Rafaela Scariot¹

Corresponding author:

Rafaela Scariot
Universidade Federal do Paraná
Departamento de Estomatologia, Faculdade de Odontologia
Avenida Prefeito Lothário Meissner Avenue, n. 632
CEP 80210-170 – Curitiba – PR – Brasil
E-mail: rafaela_scariot@yahoo.com.br

¹ Department of Stomatology, School of Dentistry, Universidade Federal do Parana – Curitiba – PR – Brazil.

² School of Health Sciences, Universidade Positivo – Curitiba – PR – Brazil.

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Abstract

Introduction: The transmission of viruses between species and the emergence of viral pandemics are threats to public health and with catastrophic aftermath for the population. **Objective:** The objective of this research was evaluated actions of Brazilian dentists concerning covid-19 during the first wave of the pandemic. **Material and methods:** The survey was conducted with a web-based questionnaire, from 8th July to 8th August 2020. The participants answered questions about socio-demographic factors, followed by actions towards the covid-19, that include service offered in the pandemic period, personal protective equipment (PPE), mode of prevention, emergency with a suspect case and urgency with a confirmed case. All data were submitted to descriptive and inferential statistics with a 5% significance level. **Results:** A total of 393 participants were recruited, 27.7% men and 72.3% women with a median age of 30 years (21 – 61). About service offered in the pandemic period 53.4 % of the participants answered to operate as a “usual service with a longer period between patients”. Professionals who do not

work in universities have adopted actions of “increasing the time between dental appointments” ($p = 0.04$) or “operate as usual” ($p = 0.02$). Nearly PPE, 48.9% wore an N-95 mask. Regarding mode of prevention, older and more experienced dentists adopted more preventive measures than younger and more experienced dentists ($p > 0.05$), in addition, men choose pre-procedural mouthwash with PVPI more than women ($p = 0.014$). Likewise, those who work at universities also choose pre-procedural mouthwash with PVPI more than those who do not work at universities ($p = 0.004$). The action regarding urgency and emergency care varied according to the educational level of the participant. **Conclusion:** It is important to emphasize that during this moment of uncertainty, it is necessary to be constantly aware of new scientific evidence. While generally accepting of federal and state recommendations, respondents seemed to desire more guidance during the initial phase of the pandemic. Some participants' actions towards covid-19 were divergences from the recommendations proposed by the regulatory agencies.

Introduction

The transmission of viruses between species and the emergence of viral pandemics are threats to public health and with catastrophic aftermath for the population. The covid-19 resulted in approximately 543 M confirmed cases and 6 M deaths worldwide until June 2022 [6]. Measures such as social distancing, restrictions, or lockdown business establishments were put in place to contain the spread [13].

The dental units presents a high biological risk for the dental team and the patient for the Covid-19 virus, mainly because of aerosol-generating instruments [9, 19, 24]. Health sectors, such as the World Health Organization (WHO) and the American Dental Association (ADA), have issued protocols to control the dissemination of covid-19 during emergency dental care at the peak of the first wave outbreak of the pandemic. In Brazil, the National Surveillance Agency of Brazil (Anvisa) and the Brazilian Federal Council of Dentistry (FCD) recommended the suspension of elective treatments in the country. Several precautions measures to reduce and prevent aerosol production are recommended, which include disinfection of the clinic, hand washing, use of personal protective equipment (PPE), use a specific mouthwash before dental procedures, isolation with rubber dam, use of hand cutting instruments (avoid high- and low-speed dental handpiece), detailed patient assessment and emergency care only [4, 15] even though there are divergences about these recommendations.

This study aimed to evaluate actions of Brazilian dentists and final-year dental undergraduates concerning covid-19 during the first wave of the pandemic.

Material and methods

Study design and ethical aspects

This cross-sectional study was conducted based on the anonymous virtual surveys and was submitted to Brazilian dentists.

The survey was conducted from July 8th to August 8th, 2020.

This study was approved by the Research Ethics Committee at the Positivo University (n. 33828820.1.0000.0093). Confidentiality was guaranteed throughout the investigation process in accordance with the Declaration of Helsinki.

Sample size estimation and participant recruitment

The parameters used for the sample calculation were based on the estimated population of dentists of 361,845, according to the Federal Council of Dentistry of Brazil in 2021. The calculation was performed with a 95% confidence interval, an anticipated frequency of 50%, and a design effect of 1 (www.openepi.com).

For recruitment, the invitation to the survey began with WhatsApp[®] (WhatsApp Messenger, WhatsApp Inc., Mountain View, California, USA). WhatsApp[®] messages being sent to registered

dentists (convenience sampling) and, later, included campaign an open social media Instagram® (Facebook, Inc, Menlo Park, California, USA) targeting group of dentists. Irrespective of the mode of invitation since all led the respondent to a unique Google Forms® (Alphabet, Mountain View, CA, USA) link.

The inclusion criteria were Brazilian dentists, over 18 years old, of both sexes, that were selected regardless of their place of work. The exclusion criterion was the inadequate filling of the questionnaire.

Testing of the instrument

A pilot questionnaire test was done, a self-administered electronic questionnaire was designed to provide data on possible changes in attitudes toward covid-19 and infection control in dental clinics. The questionnaire was pretested using a sample of 25 dentists, who evaluated dynamics, sequence, clarity, relevance, objectivity, consistency and adequacy of the questions designed by the researchers. The pilot test was important for the purpose of including other response options, some changing the order of questions and answers, and simplifying some terminologies.

Study instrument

Before the questionnaire began, the participant went through two sections. The first section of the questionnaire contained the title and main objective of the study, an invitation was extended to dentists and final-year dental undergraduates to participate. The second section was informed consent. The second section was the informed consent.

The third section was the questionnaire written in Portuguese and developed based on practical guidelines recommended for dentists and dental staff by Brazilian health regulatory agency to dentists, Anvisa and FCD [6]. The structured questionnaire contained 18 mandatory items and divided into two screens. The first screen comprised of sociodemographic data, such as sex (female or male), age (up to 30 years old or 30 years old or more), education level (graduate – DDs, specialist – DSp, master – MSc or doctor – PhD), time in dental practice (less than or equal to 15 years or more than 15 years) and place of work (universities or not work in universities – who work only in Public/Private sector). The second screen comprised of questions pertaining to the dentist's action towards the covid-19 pandemic, in which they were asked about:

- service offered in the pandemic period;
- PPEs;
- mode of prevention;

- emergency with a suspect case;
- urgency with a confirmed case.

After completing the questionnaire, the participant received feedback on the corrected answers with information about the subject and links from official websites.

Statistical analysis

Data were analyzed using the Statistical Package for the Social Science (IBM SPSS® for Apple OS, version 21.0, Armonk, NY: IBM Corp). The sample size was calculated by the Open Epi web-based calculator (Open-Source Epidemiologic Statistics for Public Health, Version. www.OpenEpi.com). All inferential analyses were attributed to a level of significance of $p \leq 0.05$. The variable age (≥ 30 or <30 years) was dichotomized by the median since it was distributed non-parametrically. The association between the sociodemographic variables with the participants' awareness and actions on covid-19 was verified through the Chi-square test or Fisher's Exact test when one cell or more had a count less than 5. The Bonferroni Correction was used when more than two groups with a statistical difference, was detected. For this analysis, we used the OpenEpi (Open Source Epidemiologic Statistics for Public Health, Version. www.OpenEpi.com).

Results

The sample consisted of 393 people, with a median age of 30 years (21–61 years). Table I depicts the sociodemographic information.

Table I - Sociodemographic information of participants

Sociodemographic information		N. of participants	% of participants
Sex	Female	284	72.3
	Male	109	27.7
Education level	DDs and DSp	261	66.4
	MSc and PhD	132	33.6
Time in dental practice	≤ 15 years	271	69.0
	> 15 years	122	31.0
Place of work	Universities	119	30.3
	Public/Private sector	274	69.7

Service offered in the pandemic period

Initially, the questionnaire investigated the type of service offered by the dental surgeon during the pandemic, through the question: "Are you offering services as a dentist throughout the pandemic?". It was obtained as a response that 7.4% were attending "just urgency", 17.6% said they were attending only "urgency/emergency", 53.4% were "operate as usual", adding additional minutes between patients, 4.6% said they were "operate as usual" and 17% said they would "not attend".

There was no association with the type of service providing with sex ($p = 0.927$) between the participants with more age and younger participants ($p = 0.645$). Regarding education level, it was observed that DDs e DSp preferentially with "additional minutes between patients" than "just urgency" or "urgency/emergency" when compared to MSc e PhD ($p = 0.0001$) and ($p = 0.0003$), as well "operate as usual" significantly more than "just urgency" or "urgency/emergency", when compared to MSc e PhD ($p = 0.004$) and ($p = 0.02$). While

Dentists MSc/PhD "not attend" significantly more in relation to "urgency and emergency" ($p = 0.0006$), "additional minutes between patients" ($p < 0.00001$) and "operate as usual" ($p = 0.00002$) when compared to DDs and DSp. There was no association with time in dental practice and type of service providing ($p = 0.429$). When comparing the type of service provided with the sector in which it operates, important differences were found ($p < 0.00001$). Dentists not working in universities preferentially with "additional minutes between patients" than "just urgency", when compared to dentists working in Universities ($p = 0.04$), as well "operate as usual" significantly more than "just urgency", when compared to dentists working at Universities ($p = 0.02$). While dentists who worked at universities "not attend" significantly more in relation to "just urgency" ($p = 0.01$), "urgency and emergency" ($p < 0.00001$), "additional minutes between patients" ($p < 0.00001$) and "operate as usual" ($p < 0.00001$) when compared to dentists not working in universities. Table II showed data with statistical significance.

Table II - Association between type of service provided and place of work, education level

	Place of work			Education level		
	Universities	Not Universities	P value	DDs/DSp	MSc/PhD	P value
Just Urgency	12	17		16	13	
Urgency/Emergency	16	53		47	22	
Additional minutes between patients	39	171	<0.001	155	22	<0.001
Operate as usual	2	16		17	1	
Not attend	50	17		26	41	

Chi-square test. Bold values mean statistical significance

PPEs

About the PPEs measures the most used were disposable cap and face shield (figure 1). When we analyze the protective equipment and the sex of the dentists, women's dentists employed disposable surgical aprons much more than males ($p = 0.030$).

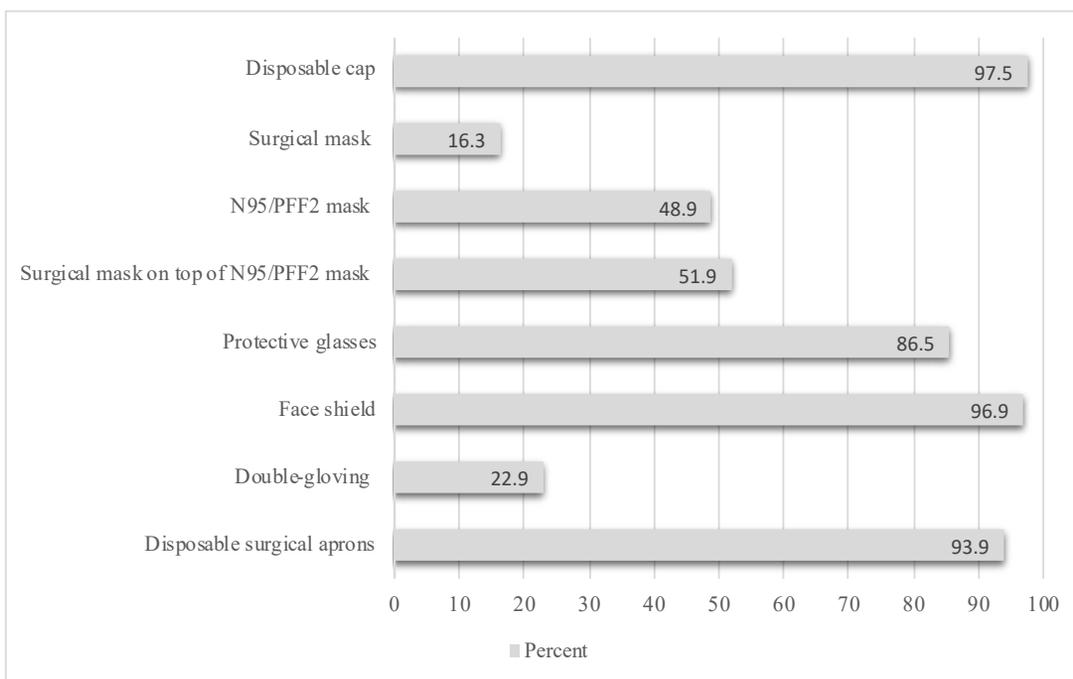


Figure 1 - Protective measures taken by dentist used for oneself

As for to wear surgical mask on top of N95/PFF2 mask the younger participants adopted this behavior significantly more when compared to the most older ones ($p = 0.034$). Another difference found was in relation to the use of disposable surgical aprons, with women using them significantly more than men ($p = 0.05$). No significant differences were found regarding the use of other PPE and sex, age, education level, time in dental practice and place of work.

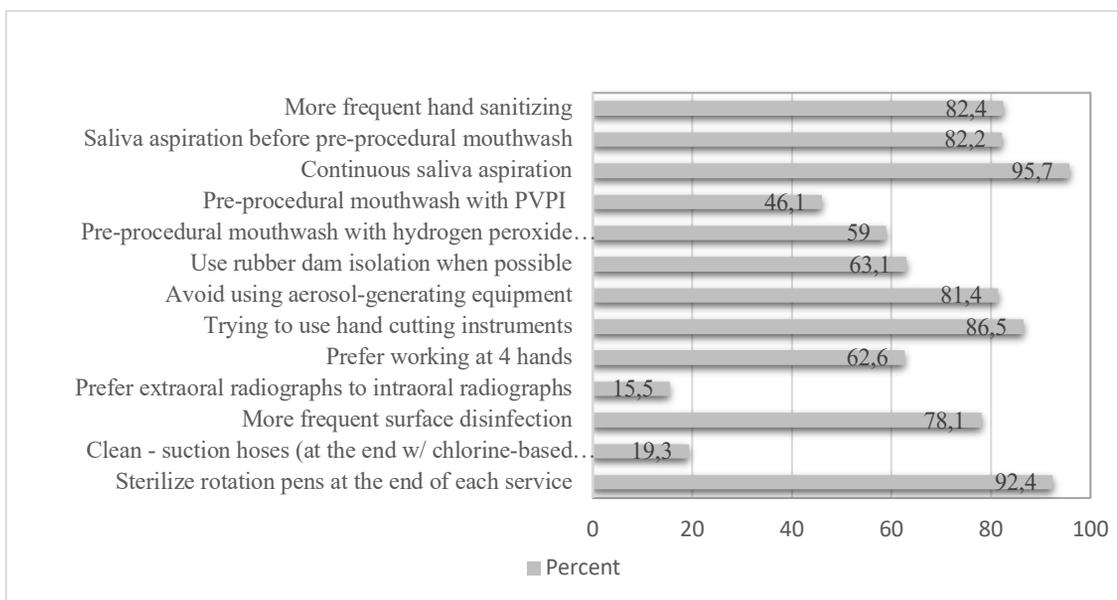


Figure 2 - Actions regarding modes of prevention for covid-19

Mode of prevention

About the modes of prevention for covid-19 adopted by the study participants in the dental practice for asymptomatic covid-19 patients (figure 2) and its association with sex, age, education level, time in dental practice and place of work. In the association between modes of prevention and sex, women reported “more frequent hand sanitizing” than men ($p = 0.05$). Men reported performing more “pre-procedural mouthwash with PVPI” ($p = 0.014$) and greater preference for “working at 4 hands” than women ($p = 0.05$).

In terms of age, we found that the participants with more age “avoid using aerosol-generating equipment” ($p = 0.020$), as well as reported “working at 4 hands” ($p < 0.0001$), also reported “prefer extraoral radiographs to intraoral radiographs” ($p < 0.0001$) and reported “sterilize high and low rotation pens at the end of each procedure” ($p < 0.0001$) significantly more than younger participants.

Regarding the differences found in relation to education level, we found that MSc e PhD reported performing more “saliva aspiration before pre-procedural mouthwash” ($p = 0.05$) and accomplish

“continuous saliva aspiration” ($p = 0.003$), as well as reported “use rubber dam isolation when possible” ($p = 0.018$), “avoid using aerosol-generating equipment” ($p = 0.020$), “trying to use hand cutting instruments” ($p < 0.00001$), “working at 4 hands” ($p < 0.0001$), “prefer extraoral radiographs to intraoral radiographs” ($p = 0.038$) and “sterilize high and low rotation pens at the end of each procedure” ($p = 0.011$) significantly more than DDs and DSp.

About the time in dental practice we found that Dentists with more of 15 years of work reported “use rubber dam isolation when possible” ($p = 0.05$), “trying to use hand cutting instruments” ($p = 0.013$), preference for “working at 4 hands” ($p = 0.005$) and “sterilize high and low rotation pens at the end of each procedure” ($p < 0.00001$) significantly more than Dentists with less or 15 year of work.

In relation to place of work it was observed that those who work at universities performing more “pre-procedural mouthwash with PVPI” ($p = 0.004$), “avoid using aerosol-generating equipment” ($p = 0.024$), “trying to use hand cutting instruments” ($p < 0.00001$) and “prefer extraoral radiographs to intraoral radiographs” ($p = 0.028$) significantly more than those who worked at private/public sector.

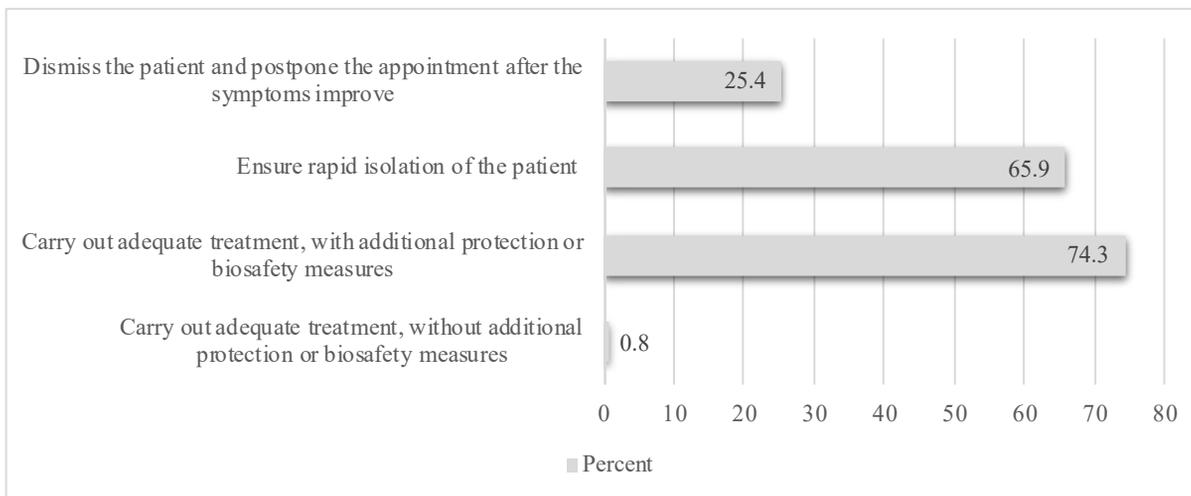


Figure 3 - Actions towards a dental emergency in suspect covid-19

Emergency with a suspect case

The results refer to the association between participants’ actions towards a dental emergency in suspect covid-19 case (figure 3) with sex, age, education level, time in dental practice and place of work. The only difference found with statistical significance was in relation to “ensure rapid isolation of the patient” and education level, with MSc and PhD reporting significantly more this attitude ($p = 0.013$).

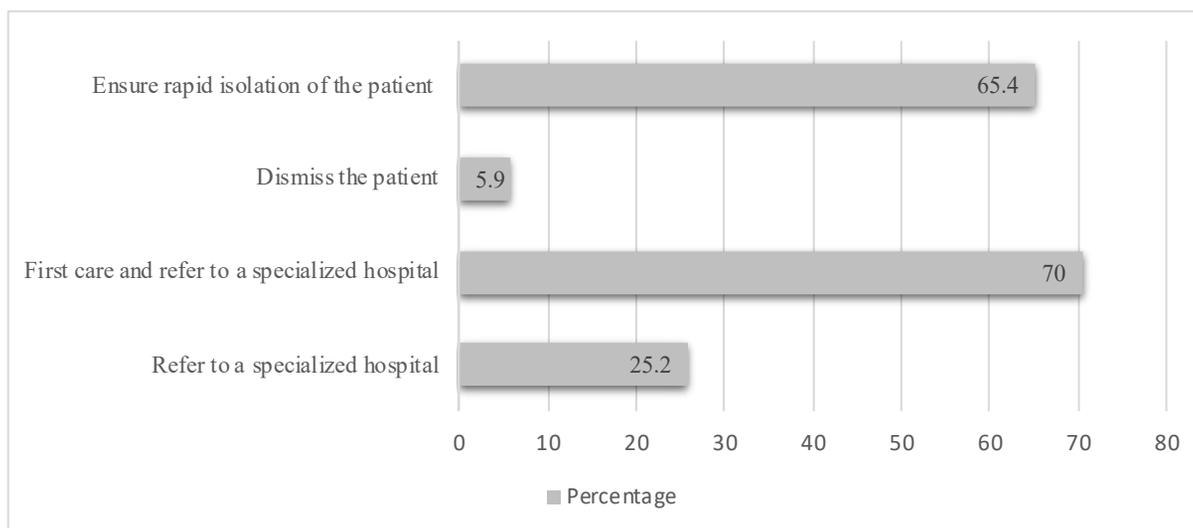


Figure 4 - Actions towards a dental urgency in patients with confirmed covid-19

Urgency with a confirmed case

About the actions towards a dental emergency in patients with confirmed COVID-19 case (figure 4) and its association with sex, age, education level, time in dental practice and place of work. We found that MSc and PhD “ensure rapid isolation of the patient” significantly more than DDs and DSp ($p = 0.05$) and DDs and DSp “dismiss the patient” significantly more than MSc and PhD ($p = 0.002$).

Discussion

In another part of this series, we provide an insight into the level of knowledge of Brazilian dentists and final-year dental UG in times of pandemic [22]. This research, we provide a view on the level of service offered, PPEs, prevention, emergency with a suspect case and urgency with a confirmed case of dentists in times of pandemic. On July 8, 2020, when we started this survey, the number of cases had reached its peak of this year, corresponding to the highest number of cases and deaths from covid-19 in the southern region of Brazil in the first wave [5].

Regarding the study sample, women were predominant due to the fact that the number of female dentists in Brazil (72.3%) is higher than the number of male dentists (27.7%) [10]. Most of the participants were young adults, with a median age of 30. Regarding the time in dental practice, most participants have been working as a dentist for a period of up to fifteen years.

In our study, 53.4 % of the participants answered to operate as a usual service with a

longer period between patients. Our data suggest that professionals who do not work in universities have adopted actions of increasing the time between dental appointments ($p = 0.04$) or operate as usual ($p = 0.02$), compared to professionals who work in universities. We believe that one of the reasons for those who do not work in universities to attend in a normal way during the first peak of the pandemic is the financial issue, those who work in universities have another source of income such as working as a professor or receiving some kind of scholarship. In addition, according to the FCD guidelines, there is no consensus on the waiting time to reuse the office after the procedure, but, if possible, it is suggested that the environment it is suggested that the environment be aired, at the end of each service, for air for air renewal during the entire cleaning time [3, 4]. However, there is evidence in the literature that the virus responsible for covid-19 remains in aerosol for 3 hours having a half-life of 1.1 to 1.2 hours. Additionally, after contamination on plastic and stainless-steel surfaces, the virus remains for 2 hours to 9 days [7, 17, 20]. Even with the recommendations proposed by the national or international health agencies for restricted care [4] of urgencies and emergencies cases in the survey period, a significant percentage of the sample still opted for normal services with a longer period between patients. This data highlights the need for greater control by the dental councils to ensure the correct conduct since it deals with a public health issue of worldwide scope.

The actions towards PPEs generated repercussions regarding the use of a mask in dental care. This research showed that only 48,9%

wore an N-95 mask. Torres *et al.* [23] reported that 80% of respondents used an N-95 mask. Dentists with 30 years or less have adopted significantly more to wear N95/PFF2 mask than professionals aged 31 years or more ($p = 0.034$). The healthcare professional should not wear the surgical mask on top of an N95 mask or equivalent, because it has not been proven, yet, to ensure filtering or avoid contamination and it can also lead to a waste of PPE [4]. Although these actions represent an attempt to increase protection and reduce the risk of contamination of the professional, contrariwise, they can have an opposite effect, since there is no ideal adaptation of the mask as proposed by the manufacturer, it can lead to a false sensation of a reduced chance of contamination, which can occur during the removal of PPE. Additionally, there is a concern about PPE waste and its worldwide shortage, considering the high demand for that equipment. During the period of this research there was a shortage of PPE in Brazil, as evidenced by several reports [1, 2, 21]. All PPE resources were redirected to hospitals.

Since the beginning of the pandemic, the literature has been seeking evidence regarding the prevention of covid-19 in dental practice. One of the points noted in this study was that both older and more experienced dentists adopted more preventive measures than younger and more experienced dentists, such as working 4-handed and sterilizing the low and high rotation pens at the end of each procedure ($p > 0.05$). This shows that older and more experienced dentists are afraid of being infected as increasing age has been shown to be associated with a higher risk of serious diseases and complications with covid-19 [14].

Still on prevention measures, one of the subjects with high divergence nowadays is the substances used for pre-procedural mouthwash to reduce the pathogens in the aerosol and decrease the risk of contamination [12, 16]. In this study, men choose pre-procedural mouthwash with PVPI more than women ($p = 0.014$). Likewise, those who work at universities also choose pre-procedural mouthwash with PVPI more than those who do not work at universities ($p = 0.004$). Pre-procedural mouthwash with 0.5% - 1% Hydrogen Peroxide and PVPI is the substance recommended by the FCD [4]. It is described in the literature as efficient in combating the covid-19 [20]. However, Ortega *et al.* [18] state in their systematic review that no studies in the literature prove the efficacy of 0.5% - 1% Hydrogen Peroxide as virucide for disinfecting surfaces. In the updated guidelines of October 2020, there was a

modification of no longer use of substances that are commonly used as a pre-procedural mouthwash. We believe that during this pandemic period, the desire to find answers and return to clinical activities led to the issue of interim guidelines with less rigor concerning scientific evidence, which can bring us a false sense of security during dental appointments.

Another point about covid-19 prevention in dental practice is about working 4-handed. Our study showed that men are more likely to choose 4-handed working than women. Perhaps this is because women believe they can multitask.

All procedures in dentistry should be considered high risk for covid-19 transmission whether the patient is asymptomatic and also it is a dental emergency or urgency case [11]. In a case report inserted in the questionnaire regarding a dental emergency in a patient with a suspected covid-19 participants with MSc and PhD degree responded to rapid isolation of the patient significantly more than DDs and DSp ($p = 0.013$). In the other case report with an emergency situation in a patient with confirmed covid-19, participants with MSc and PhD degree responded to rapid isolation of the patient significantly more than DDs and DSp ($p = 0.05$) and DDs and DSp "dismiss the patient" significantly more than MSc and PhD ($p = 0.002$). as in another study, the level of education interfered with the action taken by the dentist [8]. First wave of pandemic, it is recommended that only dental emergency and urgency cases should be carried out with standard and additional precautions for the entire team [4].

One limitation of the present study should be addressed. Because of the increasing pursuance for answers about covid-19 and SARS-Cov-2, new information is daily generated, so when comparing the data present in the guidelines of the FCD with the literature at first wave, we observed that some aspects remained in compliance and others divergent.

During the peak of the pandemic the dentists' action regarding the type of service offered was usual service with a longer period between patients or operating normally. Regarding PPEs only half of the interviewees mentioned using N-95. The action regarding urgency and emergency care varied according to the educational level of the participant. It is important to emphasize that during this moment of uncertainty, it is necessary to be constantly aware of new scientific evidence. While generally accepting of federal and state recommendations, respondents seemed to desire more guidance during the initial phase of the pandemic.

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