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How does the quarantine resulting from COVID-19 impact dental appointments and patient anxiety levels?

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Abstract: The present study sought to evaluate the impact of quarantine resulting from the coronavirus disease 2019 (COVID-19) pandemic on dental appointments and patients' positions and concerns regarding their ongoing dental treatment. Patients from private dental clinics answered an online questionnaire anonymously regarding their treatment, availability and willingness to attend dental appointments, and concerns about contamination. Descriptive statistics of the responses were performed with percentages and responses were compared between sexes, regions, and other aspects using the chi-squared test. Five hundred ninety-five patients (412 females and 183 males; mean age: 38.21 years) answered the questionnaire. Most patients reported they were receiving dental treatment (orthodontics) and would attend to a dental appointment; meanwhile, those patients not receiving treatment would not attend or would visit only in the case of an emergency. Males reported to be calmer than females, who were more anxious and afraid; as such, males reported more willing to go a dental appointment while, in general, females were not worried about how quarantine could affect dental treatment. Patients actively undergoing treatment and orthodontic patients were more concerned about a delay in treatment. There was a significant association between feelings about the COVID-19 pandemic and the level of willingness to attend a dental appointment. The quarantine recommended due to the COVID-19 pandemic was shown to have an impact on dental appointments and the anxiety levels of patients, since there was a significant association between patients' feelings and their willingness to attend a dental appointment. Overall, patients undergoing dental treatment and orthodontics were more willing to attend an appointment and were more concerned about an increase in treatment duration.

Keywords: COVID-19; Coronavirus; Infections; Dental Care.

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, responsible now for coronavirus disease 2019 (COVID-19) cases worldwide, originated in Wuhan, China, in late 2019 and, some months later, the World Health Organization (WHO) labeled the virus' spread across the globe as a pandemic. The risk assessment according to the

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WHO for COVID-19, a viral infection caused by SARS-CoV-2, is very high, with a global impact. As of April 12, 2020, there were 1,696,588 confirmed cases of COVID-19, including 105,952 deaths, reported by the WHO.[1]

To date, the countries that have suffered the most from the COVID-19 pandemic include China, Italy, Spain, the United Kingdom, and the United States. Infection control measures are being designed and introduced by all healthy authorities around the world to prevent the virus from further spreading and to help in controlling the pandemic situation.[2] Many of these countries have implemented strategies to slow the expansion and infection of SARS-CoV-2, including the provision of virus tests, extreme social isolation, localized quarantines, and the monitoring of the most vulnerable populations; the measures taken are largely guided by the official WHO website based on the number of cases in each country.[3]

Given the SARS-CoV-2 virus may easily infect an individual through contact with secretions or aerosols and, due to the characteristics of dental care, the risk of cross-infection between patients and dental practitioners is high.[4] To limit the advance of the COVID-19, the adoption of strict and effective infection control protocols is urgent. In this sense, besides the recommendations for good hand hygiene and the importance of thorough disinfection of all surfaces of the dental clinics,[5,6] guidelines and recommendations for the management of dental practitioners and students are necessary.[4]

In many places at this time, dentists are not allowed to provide conventional dental treatment, being instead restricted to only handling urgencies and emergencies. Elsewhere, quarantine is recommended but dental offices are still able to stay open while following the recommendations of the federal board of dentistry and national dental associations.[7] Amid this situation, patients remain uncertain about whether to attend their dental appointments or not. However, little is known about this feeling and the level of anxiety experienced by patients regarding the continuity or interruption of dental treatment and the resulting impact, as we are facing a new situation not experienced previously by any of us.

This study therefore aimed to assess the impact of quarantine due to the COVID-19 pandemic on dental care and appointments and clarify patients' positions and concerns about their ongoing dental treatments.

Methodology

This study was approved by the Ethics Research Committee of the UNINGÁ University Center (CAAE no. 30797120.0.0000.5220).

A sample-size calculation for the included survey was performed considering the total of 2,000 patients of five private dental clinics, with a margin of error of 5% and a confidence level of 95%. The results showed the need for at least 323 responses.

An informative survey by which patients could report how they were feeling about the pandemic and how anxious they were about their oral health and dental treatment plan was developed. A Google Forms questionnaire (Google LLC, Mountain View, CA, USA) was sent to 1,000 randomly selected patients of private dental clinics from the clinicians A. A. M., K. M. S. F., F. P. V., N. I. P. P., and R. C. G. O., located mainly in three metropolitan cities of three different regions of Brazil: Maringá, Paraná (in the south); Bauru, São Paulo (in the southeast); and Porto Velho, Rondônia (in the north). The link with the questionnaire was sent by WhatsApp Messenger (WhatsApp Inc., Menlo Park, CA, USA) only once. Patients also had support for doubts regarding the questions and answers, if needed. Patients and their respective doctors were not identified. Eligible patients were those older than 18 years of age and who agreed to participate when answering the questionnaire.

Participants answered questions about their age, sex, the city in which they live, whether they had any symptoms related to COVID-19, and whether or not they were undergoing dental treatment and—if yes—which specialty (*e.g.*, orthodontic, restorative). In addition, they reported whether or not their dentist had gotten in touch to schedule an appointment or return, if they would agree to go, or if they would only go in the case of an emergency and what were their concerns both about attending a dental appointment and how quarantine might affect their dental treatment plan (Figure 1).

1. How old are you?
2. Gender: ( ) Male ( ) Female
3. Where do you live (City/State)?
4. Have you had or are you experiencing symptoms of COVID-19?
( ) Yes ( ) No
5. How are you complying the quarantine?
( ) I don't leave home for nothing
( ) I leave home as little as necessary (to buy food/medicine)
( ) I go out normally, I'm doing several activities
( ) I am not in favor of quarantine
6. Do you work or study? If so, how is your activity?
( ) Yes, I am going out for work/study
( ) Yes, but I am working/studying at home
( ) I do not work/study
7. Considering the general anxiety level, how are you feeling about the quarantine and the coronavirus pandemic?
( ) Calm
( ) Anxious
( ) Fear
( ) Panic
( ) Indifferent
8. Are you undergoing dental treatment?
( ) No
( ) Yes, orthodontic (appliances)
( ) Yes, restorative treatment (caries, restorations)
( ) Yes, endodontic treatment (obturations)
( ) Yes, esthetic treatment (whitening)
( ) Yes, facets/contact lenses
( ) Yes, oral rehabilitation (implants, prosthesis)
( ) Yes, orofacial harmonization (botulinum toxin, fillings)
9. If your dentist got in touch to schedule an appointment/return during the quarantine, would you accept/go?
( ) Yes
( ) Only in case of urgency/emergency
( ) No
10. What is your concern of attending a dental appointment?
( ) The risk of contaminating myself and my family
( ) I think dental offices represent a high risk
( ) My treatment is not urgent
( ) No concern
11. What are your concerns about how quarantine can affect ongoing dental treatments?
( ) It will delay the treatment, I was anxious for the result and to finish the treatment
( ) I am afraid of losing the investment I made (time/money) or of my situation (mouth/teeth) get worse
( ) I am not worried
12. What do you consider important, in the actual stage of pandemic, in dental office? (choose all that apply)
( ) Disposable lab coat for the dentist, changed each patient
( ) Type N95 surgical mask for the dentist, changed each patient
( ) Avoid crossing with other patients in the waiting room
( ) PPE for patients (mask, foot and disposable lab coat)
( ) Alcohol gel at reception for patient use

Figure 1. Questionnaire applied to the patients.

The questionnaire was available for use for only 48 hours, in an early stage of the pandemic. Responses were obtained and tabulated in Excel (Microsoft Corp., Redmond, USA) for statistical analysis.

To test the reliability of the answers to the questionnaire, question 9 was repeated twice in the survey. This question was chosen for repetition because it has only three responses, including yes or no, and was a critical and important question in the survey. This allowed us to calculate an intraclass correlation coefficient of 0.86, suggesting excellent agreement.

Statistical analysis

Descriptive statistics of the responses were performed, with percentages. Comparisons of patients undergoing dental treatment or not and orthodontic patients versus those receiving treatment from other specialties both between the sexes and among the three regions where the patients live were conducted using the chi-squared test.

To check the presence of an association between feelings about quarantine and the COVID-19 pandemic and willingness to go to a dental appointment, the chi-square test was applied.

Statistical analysis was performed with the Statistica version 10.0 software program (Statsoft, Inc., Tulsa, USA) and the results were stated as significant for $p < 0.05$.

Results

Five hundred ninety-five patients answered the questionnaire. The response rate was 59.5%. The mean age of the participants was 38.21 years (standard deviation: 13.94 years) (Q1). Most of the patients were female (412/595; 69.2%), with a mean age of 38.53 years (standard deviation: 13.41 years); meanwhile, among the males (183/595; 30.8%), the mean age was 37.49 years (standard deviation: 15.07) (Q2). Of the 176 patients were from the southeast (29.6%), 239 were from the south (40.2%), and 180 were from the north (30.2%) regions, respectively. Only six respondents (1%) reported having symptoms of COVID-19 (Q3 and Q4).

With respect to the quarantine (Q5 and Q6), 78% (464/595) said they were actively going out in public only when needed, 12.8% (76/595) were not leaving home at all, and 4.5% (27/595) were conducting normal activities and going out regularly. Only 4.7% (28/595) of respondents said they were not in favor of the quarantine. Most patients (324/595; 54.4%) reported they were working or studying at home, while 27.7% (165/595) were going out for work or study. The remaining respondents (106/595; 17.8%) were not conducting any work or study.

Regarding feelings about the COVID-19 pandemic in the early stage (Q7), 41.8% (249/595) of the patients were calm, 28.6% (170/595) reported experiencing anxiety, 23.2% (138/595) exhibited fear of the disease, 2.2% (13/595) were panicked, and 4.2% (25/595) were indifferent. Figure 2a shows that there was no difference between patients under treatment or not with regard to the answer to this question.

More patients (354/595; 59.5%) were undergoing dental treatment when the questionnaire was answered than not (241/595; 40.5%) (Q8). The type(s) of treatment (Q8) being performed included orthodontic (263; 74.3%), oral rehabilitation (65; 18.4%), or restorative or other (26; 7.3%). Among the patients under treatment, 38.3% (228/595) stated they would go to a dental appointment if the dentist/staff called to schedule, 44.2% (263/595) said they would go only in the case of an emergency, and 17.5% (104/595) said they would not go for any reason (Q9). Figure 2b highlights significant differences between the patients under treatment or not with respect to the answers to this question. Most patients receiving treatment said they would attend a clinical appointment (198/365; 55.9%), while most of the patients not receiving treatment would not attend or would only go in the case of an emergency (124/241; 51.4%) ($p = 0.000$).

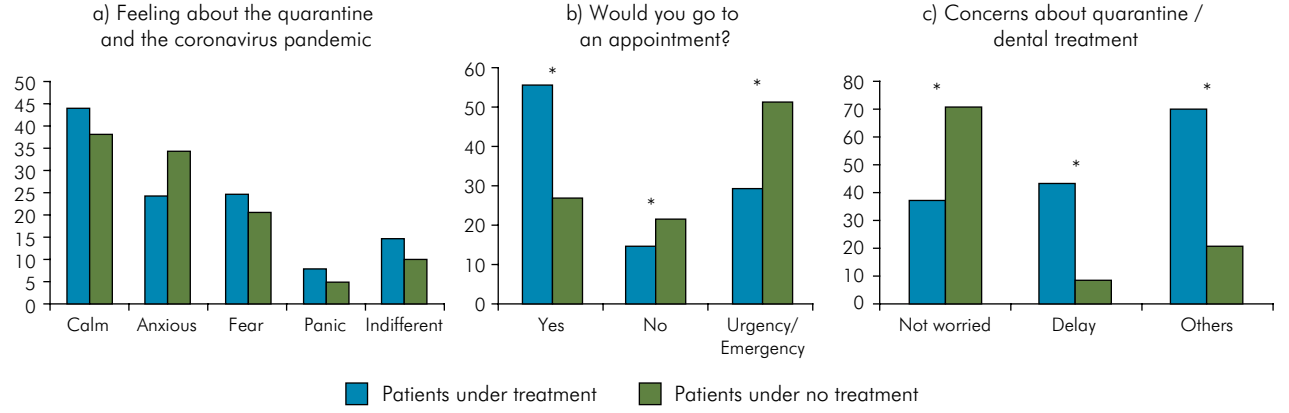
Concerns reported among the respondents about attending a dental appointment (Q10) included the risk of getting infected and/or contaminating the family (110/595; 18.5%); while only 5% (30/595) said they were afraid because dentists are a group at high risk of contamination. Several patients answered that their treatment is not urgent and can wait (120/595; 20.2%) and most (335/595; 56.3%) showed no concern in answering this question.

Considering the concerns of the respondents about how quarantine might affect ongoing dental treatment plans (Q11), half (304/595; 51.1%) were not concerned and 31.3% (186/595) were concerned about a delay in treatment as they were anxious

about achieving optimal results and/or reaching the end of treatment. Some patients (105/595; 17.6%) were afraid that the state of their mouth and/or teeth would worsen or were concerned about losing the investment (time and money) already put into treatment. Figure 2c indicates significant differences existed between patients under treatment or not in this regard, showing that patients receiving treatment were more worried than those not receiving treatment for different reasons (p = 0.000).

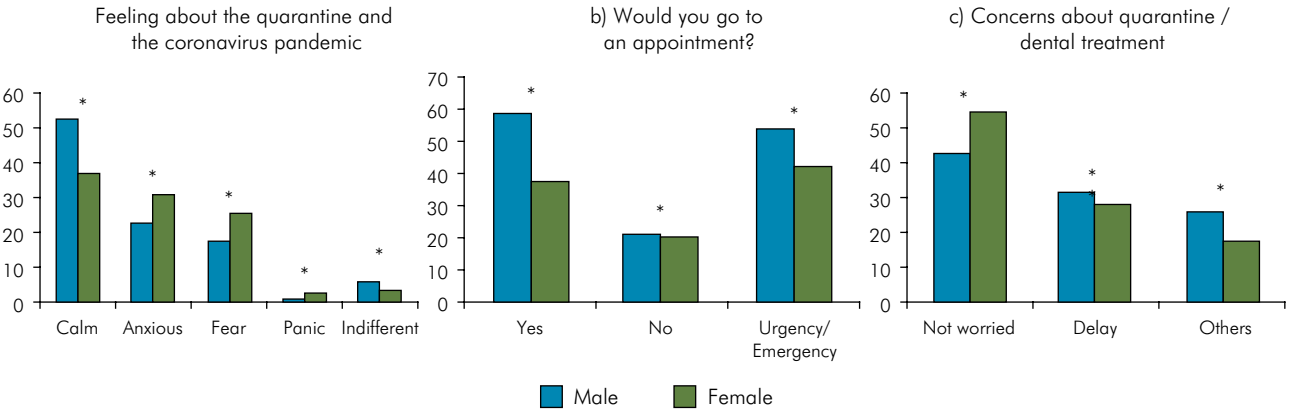
Upon comparing the results between sexes (Figure 3), it was determined that males tended to be calmer than females (p = 0.001), who reported feeling more anxious and afraid with respect to quarantine and the COVID-19 pandemic (Figure 3a). Male patients were more willing to go a dental appointment than females (p = 0.000), who would go only in the case of an emergency (Figure 3b). Females reported being less worried about how quarantine might affect their dental treatment (p = 0.017) (Figure 3c).

Patients undergoing dental treatment were more concerned about a delay in finishing the treatment (153/354; 43.2%) than patients with no ongoing treatment (20/241; 8.3%); similarly, this group remained mostly unworried about how quarantine could affect ongoing dental treatments (171/241; 71%) (Figure 2). Considering those patients undergoing active dental treatment (354/595; 59.5%), most were receiving



Asterisks indicate significant differences between patients. Statistical data: (a) $X^2 = 6.98$, DF = 4, and p = 0.136 for question 7; (b) $X^2 = 49.33$; DF = 2, and p = 0.000 for question 9; and (c) $X^2 = 92.76$, DF = 2, and p = 0.000 for question 11.

Figure 2. Comparison of patients under dental treatment or not.

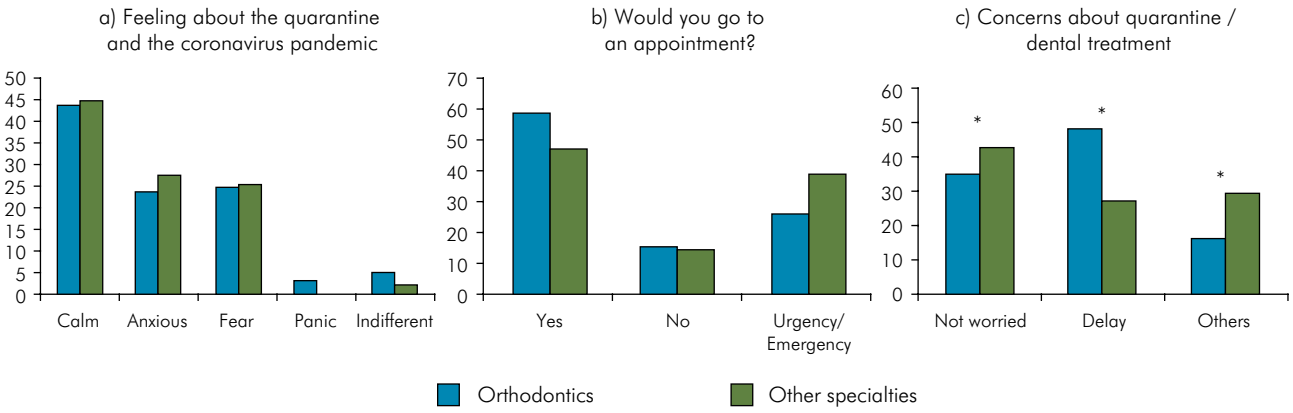


Asterisks indicate significant differences between the sexes. Statistical data: (a) $X^2 = 17.24$, DF = 4, and p = 0.001 for question 7; (b) $X^2 = 23.93$, DF = 2, and p = 0.000 for question 9; and (c) $X^2 = 8.05$, DF = 2, and p = 0.017 for question 11.

Figure 3. Comparison between the sexes.

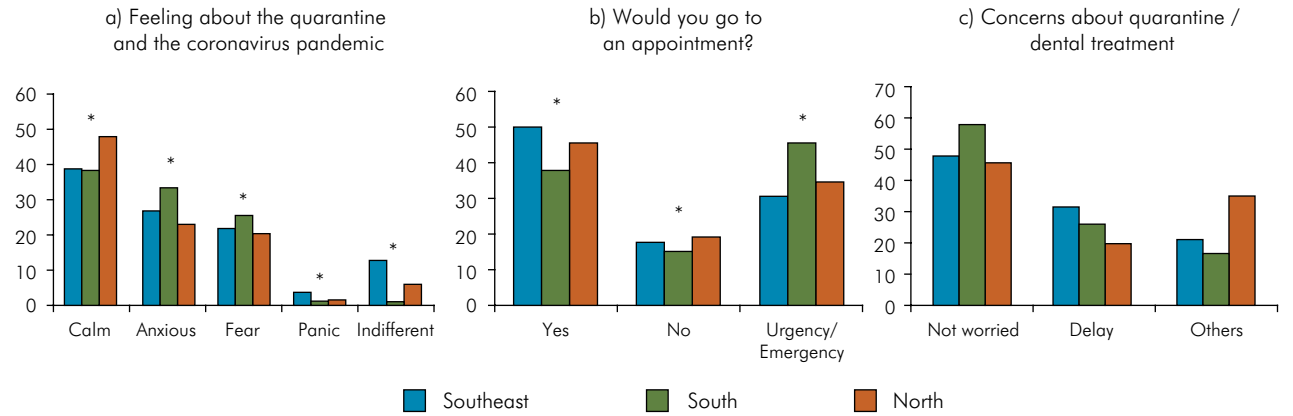
orthodontic treatment (263/354; 66.7%). These patients answered that they considered themselves calm (156/354; 44%), followed by fearful (88/354; 24.8%) and anxious (87/354; 24.5%) (Figure 4a), without a significant difference according to the type of dental treatment being conducted (p = 0.351). Irrespective of this finding, most of the patients said they would go to a dental appointment (Figure 4b). Orthodontic patients were more concerned about a delay in their treatment (128/263; 48.7%) than patients those receiving other specialties of dental treatment (25/91; 27.4%) (p = 0.000), including 42.9% (39/91) who were not worried at all about the impact of quarantine on their dental treatment (Figure 4c).

There were significant differences between the responses to questions 5 and 9 of patients from the three regions (Figure 5). More patients said they felt calm in the north region than in the other two regions; in the south and southeast, patients reported feeling more anxious and not as indifferent (Figure 5a) (p = 0.001). Meanwhile, in the southeast and north regions, more patients reported that would go to a dental appointment, while in the south region, more patients reported that would go only in the case of an emergency (p = 0.027) (Figure 4b). No significant difference was observed between the regions when considering the concerns about quarantine/dental treatment (p = 0.052) (Figure 5c).



Asterisks indicate significant differences between the treatment specialties. Statistical data: (a) $X^2 = 4.42$, DF = 4, and p = 0.351 for question 7; (b) $X^2 = 5.10$, DF = 2, and p = 0.078 for question 9; and (c) $X^2 = 14.23$, DF = 4, and p = 0.000 for question 11.

Figure 4. Comparison according to treatment specialty between patients being actively treated.



Asterisks indicate significant differences between the regions. Statistical data: (a) $X^2 = 25.54$, DF = 8, and p = 0.001 for question 7; (b) $X^2 = 10.96$, DF = 4, and p = 0.027 for question 9; and (c) $X^2 = 9.39$, DF = 4, and p = 0.052 for question 11.

Figure 5. Comparison between regions.

Table 1. Association of the feeling about the quarantine and the coronavirus pandemic and the willingness to go to a dental appointment.

Answers	Yes	No	Yes, if emergency	p-value
Calm n=249 N (%)	150 (60.2%)	30 (12.1%)	69 (27.7%)	X^2=68.61 DF=8
Anxious n = 170 N (%)	60 (35.3%)	30 (17.6%)	80 (47.1%)	0.000*
Fear n = 138 N (%)	35 (25.3%)	39 (28.3%)	64 (46.4%)	
Panic n = 13 N (%)	1 (7.7%)	4 (30.8%)	8 (61.5%)	
Indifferent n = 25 N (%)	17 (68.0%)	1 (4.0%)	7 (4.0%)	

*Statistically significant for $p < 0.05$; Chi-square test.

There was a statistically significant association between the feelings reported concerning quarantine and the COVID-19 pandemic and the willingness to go to a dental appointment (Table). Patients who were calm or indifferent were more willing to attend an appointment (60.2% and 68%, respectively) than those that reported being anxious, afraid, or panicked (35.3%, 25.3%, and 7.7%, respectively) (Table 1). Most of the respondents who said they were anxious, afraid, or panicked would go attend an appointment in the case of an emergency (47.1%, 46.4%, and 62.5%, respectively).

Only 42 patients (14 males and 28 females; 7.1%) were older than 60 years of age (mean age: 64.83 years, standard deviation: 5.21 years), considered a high-risk group for COVID-19. Of this group, 27 were actively undergoing dental treatment and 15 were not. Seventeen said they would only go to a dentist in the case of an emergency, 14 said they would attend appointments normally, and 11 said they would not go in any case (Figure 6).

With regard to precautionary measures taken to avoid contamination during this phase (Q12), patients found it important that dentists use disposable laboratory coats (380/595; 63.9%) and disposable masks (401/595; 67.4%). Having alcohol gel at reception was the most frequently suggested measure (508/595; 85.4%). Meanwhile, avoiding close contact with other patients at reception (378/595; 63.5%) was considered important, while a portion of respondents also suggested having personal protective equipment for patients (249/595; 41.8%).

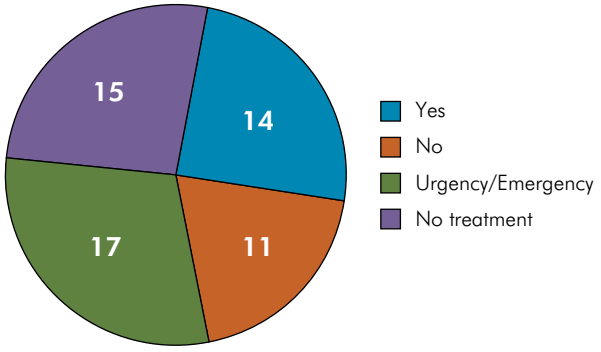


Figure 6. Risk group for COVID-19 and the relation with receiving dental treatment at the moment.

Discussion

Beginning with the release of first impressions of epidemiological data concerning the COVID-19 pandemic,[8,9] the conduct of studies about how this global event may impact mental health have been recommended.[10] When the questionnaire in this study was deployed (April 2020) the pandemic was still in a very early stage in Brazil and relatively under control in comparison with in other countries, with less than 1,000 deaths due to COVID-19 and about 17,000 confirmed cases reported.[11] According to experts, at the moment of

the survey, the COVID-19 infection curve was still rising and was far from reaching its peak in Brazil. Since infections were actively spreading;[12] however, some control measures, such as quarantine, were recommended. When the questionnaire in this study was sent to prospective respondents, quarantine had been recommended for about three weeks in all cities of the patients selected for inclusion. Some impacts, such as increased stress about behaviors that may lead to contamination and greater levels of depression attributed to social distancing and isolation, are related to increased vulnerability of mental health.[10] As such, while the primary intention of this survey was to evaluate the effects of quarantine on dental treatments, this study also provide some insights about the level of awareness, perceptions, and attitudes of patients in response to this pandemic.

The survey results in this study revealed that most patients (78%) were respecting the quarantine and going out only when really necessary, such as to buy food and medicine, and many (54.55%) were working from home. Patients were largely aware of the seriousness of the COVID-19 pandemic and reported concerns, even though this study was conducted at an early stage of the pandemic in Brazil. However, even then, most patients reported not feeling calm in relation to the situation: 28.6% reported experiencing anxiety and 23.2% felt scared. This may be due to the availability of media reports from around the world by means of television and the Internet.

The purpose of this study was not to discuss the effectiveness of the quarantine. In Brazil, the government suggested starting quarantine early, about four weeks before the application of this survey, when the first cases of COVID-19 were confirmed in the country and before the virus had spread significantly. Elective dental treatments, such as orthodontic and esthetic procedures, were not deemed essential and were postponed. Following the WHO recommendations, dental treatments were restricted to conduct only in emergency situations.[13] The focus of the present study was therefore to assess the degrees of anxiety and concern among patients, especially with regard to ongoing dental treatments deemed to be elective in nature.

Of all the patients who answered the questionnaire, 38.3% reported they would attend a dental appointment if the dentist/staff called to schedule and 44.2% reported they would go only in the case of an emergency. However, when only patients actively undergoing dental treatment were considered, the percentage that would attend an appointment increased to 55.9% in contrast with 27% of the patients who were not receiving active treatment. Most respondents who were not receiving active treatment (51.4%) answered that they would attend an appointment only if it was an emergency. This indicates, in a certain way, that patients in the middle of a course of therapy show greater care and attention regarding their treatment and probably would not miss an appointment to avoid impairing the outcome of their treatment. This is clearly evidenced in the results that show that patients under treatment are more worried than patients not under treatment. When comparing the sexes, women were less worried about a delay in reaching the end of treatment than men (Figure 3).

Patients undergoing dental treatment were more concerned about an increase in the duration of their treatment (43.2%) than those under no treatment (8.3%) (Figure 2). Besides, orthodontic patients were more concerned about a delay (48.7%) than those being treated by other specialties (27.4%) (Figure 4). This concern among orthodontic patients regarding finishing their treatment is justifiable since orthodontic treatments usually last longer than most dental treatments.[14,15] Besides, each missed appointment tends to increase the orthodontic treatment time on average by 1.09 months.[16]

Considering insights into respondents' feelings about quarantine, it can be considered that most of the patients, regardless of being under treatment or not, shared that they were anxious or scared in relation to the COVID-19 pandemic (Figure 2) and most were women (Figure 3). Women shared they were more anxious and afraid than men, who were more willing to go to a dental appointment (Figure 3). Despite the literature suggesting that, under normal situations, women are more compliant with dental treatment than men,[17] their feelings of anxiety and fear in this study affected their willingness to attend a dental appointment. Probably, women felt safer

staying at home or going to the dentist only in the case of an emergency. These results corroborate with several findings that females are more emotionally affected by difficult situations and are more likely than men to report symptoms of stress and anxiety.[18] This was reinforced when women reported they were less worried about delays in dental treatment than men. This may be possibly explained by the fact that women are more worried about the situation of the COVID-19 pandemic outbreak and concerned about other problems relating to health, financial/economic aspects, and social distancing, among others. Dental treatments are mostly nonessential and can wait until the situation normalizes.

The comparisons between select regions of Brazil revealed some differences. In general, respondents in the south region reported greater levels of anxiety and fear and most patients from this area would go to a dental appointment only in case of an emergency. Those in the north were the least affected among residents of the three regions when the survey was applied and this is probably why patients from this region were calmer and more willing to go to a dental appointment. Regardless of sex or region, however, the feelings about quarantine and the COVID-19 pandemic were significantly associated with the willingness to go to a dental appointment. Calm or indifferent patients were more willing to attend an appointment, while most of the patients who reported feeling anxious, afraid, or panicked said they would go only in the case of an emergency (Table).

As the pandemic is still not under control, dentists are advised to contact patients ongoing dental treatment regularly and, if possible, relay instructions about oral health maintenance and emergency handling.[13,19] The COVID-19 pandemic has driven an increase in teledentistry[20] as well as telemedicine and telepsychiatry,[21] where dentists can use information and communication technology to their advantage, assisting and advising patients, reducing their anxiety about the treatment duration, and supporting good outcomes and oral health and care.

However, there are situations in which a dental appointment is necessary. In these cases, guidelines from the Centers for Disease Control and Prevention, the American Dental Association, and the WHO should be followed.[13,22,23]

Besides the abovementioned recommendations, extensive care concerning disinfection and sanitization methods of the clinical environment have been suggested.[19] The results of this study revealed that patients, undergoing treatment or not, are interested in this.[24] The data of this survey are important to show that the patients are aware and that following available recommendations is important to maintain their confidence in health care professionals and their compliance with dental treatment both now and when the quarantine ends.

A limitation of this survey is the moderate range and limited coverage of the country's entire population. However, up until now, data like these were reported in the literature only using an orthodontic sample,[24] due to the singularity of the actual moment, which, for sure, will imply permanent modifications in several health treatment areas, including dentistry. The sample was nonprobabilistic and did not allow for population generalization; however, this study still provides a quick overview of the concerns and positions of patients during quarantine in Brazil. Further, while the conclusions are pertinent to Brazil, this survey brings useful information, particularly as many dental offices may soon reopen after spending some time closed and dentists should know what they can expect regarding patients' anxiety and concerns.

Conclusions

The quarantine recommended due to the COVID-19 pandemic was shown to have an impact on dental appointments and patients' anxiety since there was a significant association found between patients' feelings and their willingness to attend a dental appointment. Ongoing dental treatment is a factor leading patients to be more willing to attend an appointment.

Patients undergoing treatment were more concerned about the increase in treatment duration, while patients with no active treatment plan were mostly not worried. Orthodontic patients were more concerned than patients undergoing dental treatment by other specialties about the delay in finishing.

Patients who were calm or indifferent were more willing to go to an appointment, while most of the patients who reported feeling anxious, afraid, or panicked would go only in the case of an emergency.

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