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# Impacts of pandemic COVID-19 on dental urgencies in Primary Health Care: an ecological study

Raquel Silva Gondim[1], Laila Melo de Felix[1], Ed Wilson Rodrigues Vieira[2], Najara Barbosa da Rocha[1]

[1]Faculdade de Odontologia, Universidade Federal de Minas Gerais (UFMG) - Belo Horizonte (MG), Brazil
[2]Escola de Enfermagem, Universidade Federal de Minas Gerais (UFMG) - Belo Horizonte (MG), Brazil

## ABSTRACT

**Introduction:** After the onset of the Covid-19 pandemic, oral health care in Primary Health Care (PHC) services in Brazil focused on emergency care. **Objective:** To evaluate the impact of the Covid-19 pandemic on the number of emergency dental visits in PHC in Brazil. **Methods:** This was an analytical and ecological study with data from the Health Information System for Primary Care referring to the number of attendances performed from March to December 2018 to 2020 in PHC services throughout Brazil for toothache, abscess, and dentoalveolar trauma. Differences between the monthly medians of the number of attendances before the pandemic (April to December 2018 and 2019) and during (April to December 2020) were analyzed using the independent-samples Mann-Whitney U test considering the interquartile ranges (IQR). **Results:** Approximately 14 million cases were analyzed, with almost one-third of them occurring during the pandemic. There was a reduction in the median of the monthly number of emergency department visits in Brazil (-16.5%; p<0.031). Attendances for toothache reduced from a monthly median of 448,802.0 to 377,941.5 (IQR before [IQRa]: 416,291.7-506,150.5; IQR during [IQRd]: 310,251.0-454,206.5), dentoalveolar abscess attendances reduced from 34,929.0 to 27,705.5 (IQRa: 30,215.0-37,870.5; IQRd: 22,216.0-30,048.2) and to dentoalveolar trauma from 16,330.5 to 10,975.0 (IQRa: 14,800.0-18,472.7; IQRd: 8,111.2-13,527.5). **Conclusion:** Significant reductions were observed in the performance of emergency dental procedures in PHC during the COVID-19 pandemic.

**Keywords:** Electronic Health Records; Health Information Systems; Primary Health Care; COVID-19; Oral Health; Dentistry.

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Corresponding author: Ed Wilson Rodrigues Vieira - Universidade Federal de Minas Gerais – Avenida Prof. Alfredo Balena, 190 - Santa Efigênia – CEP: 30130-100 - Belo Horizonte (MG), Brazil -
E-mail: edwilsonvieira@ufmg.br

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## INTRODUCTION

Confronting the pandemic of COVID-19 revealed weaknesses in health systems worldwide and required adaptations to meet the new needs and challenges imposed by the health crisis, changing the organization and processes of health care, with the need for expansion of hospital care and strengthening of Primary Health Care (PHC)[1-3].

Brazil has a universal and decentralized health system, the Sistema Único de Saúde (SUS), which is one of the largest public health systems in the world and has PHC as its model of care[2,4].

From the perspective of oral health care in the SUS, in PHC, after the recognition of the pandemic in March 2020, only emergency care was recommended[5]. Dental emergencies are procedures aimed at pain relief and infection control[6], and we can cite among them odontalgia, abscesses, and trauma[7]. In PHC, it is characterized by appointments without prior scheduling for patients suffering from acute conditions or exacerbations of chronic diseases[7].

With this recommendation, dental care to the population in the public service was through emergency care. Only in November 2020, a guide was published to orient municipal managers for the re-establishment of elective care in PHC[8].

Considering the context of the pandemic of COVID-19 and the prioritization of emergency care, a question arose: during the pandemic of COVID-19, were there changes in the amount of emergency dental care in PHC in Brazil?

The objective of this study is to compare the monthly amount of emergency dental care in PHC before and during the pandemic of COVID-19, with a focus on the toothache, dentoalveolar abscesses, and dental trauma. The alternative hypothesis tested is that there was an increase in the monthly amount of emergency procedures performed during 2020 when compared to the previous years (2018 and 2019).

## METHODS

An analytical and ecological study was conducted using data from the Brazilian Ministry of Health's Health Information System for Primary Care (SISAB). SISAB has been mandatory use throughout the country since June 2015 and is part of the e-SUS Primary Care strategy (e-SUS AB)[9].

The data studied were related to the number of dental visits for dentoalveolar abscess, toothache, and dentoalveolar trauma, which are conditions in oral health surveillance relevant to public health related to emergency care performed in PHC services throughout Brazil[10].

The researchers (LFM, GSR) were trained in two 90-minute meetings for the calibration of data extraction and use of a standardized protocol that will be described below. The data extraction was done in March 2021, directly from SISAB (https://sisab.saude.gov.br/), clicking on the "health" tab, then selecting "production" and then a window opens and the following fields are selected: Geographic Unit: State; Competency: month/year (the extraction was done month by month), Type of Production: Dental Care; and Oral Health Surveillance: selected only Dento-Alveolar Abscess, Toothache, and Dento-Alveolar Trauma. In the rows of the "reports", the states were considered and in the columns, the gross quantity of assisted cases "Oral Health Surveillance" in the competence in question. For each of these "reports", standardized nomenclatures were provided in the protocol. These nomenclatures obeyed the following logic: production name; year; month; as follows: "Production- Date. csv", where "Production" referred to the production that was extracted, "Date" to the period of data competence (format AAAAMM [A - year, M - month]). After extracting the "reports", the process of organizing the databases began. The first step in the creation of the databases was the treatment of the "reports" (spreadsheets) since the data referring to the year and month were organized in rows in the headers. There was also data in the footers, but not necessary for the analysis of this study. This treatment was done with double-checking (LFM, GSR) to avoid errors.

Descriptive analyses were performed using absolute and relative frequencies of the number of attendances. The independent categorical variables studied were the periods before (April to December 2018 to 2019) and during the pandemic (April to December 2020). To analyze the impact of the COVID-19 pandemic on the number of attendances, which did not show a normal distribution, from the monthly perspective, differences between the medians of the number of monthly attendances in the periods before and during the pandemic were analyzed using the nonparametric Mann-Whitney U test for independent samples, at a significance level of 5%, considering the interquartile ranges (IIQ). The analyses were performed with Statistical Package for Social Sciences software (IBM-SPSS, v. 26, IBM, Chicago, IL).

Since this is a study that used public domain data, of unrestricted access and without the identification of individuals, the assessment was waived by the Research Ethics Committee of the Federal University of Minas Gerais (CAAE: 46914221.5.0000.5149).

## RESULTS

A total of 14,024,944 dental visits for toothache, abscess, and dentoalveolar trauma were analyzed in the period studied, 29.3% during the pandemic (Table 1). Toothache-related visits accounted for the majority of the visits in both periods studied, whereas dentoalveolar trauma represented the lowest proportion.

There was a significant reduction in the median number of monthly emergency visits in Brazil for the three conditions studied, ranging from -15.8% for toothache to - 32.8% for dentoalveolar trauma. Attendances for dentoalveolar abscesses were reduced by 20.7%. Attendances for toothache reduced from a monthly median of 448,802.0 to 377,941.5 (IIQ before [IIQa]: 416,291.7 - 506,150.5; IIQ during [IIQd]: 310,251.0 - 454,206.5). Attendances motivated by dentoalveolar abscess reduced from 34,929.0 to 27,705.5 (IIQa: 30,215.0 - 37,870.5; IIQd: 22,216.0 - 30.048.2) and those motivated by dentoalveolar trauma reduced from 16,330.5 to 10,975.0 (IIQa: 14,800.0 - 18,472.7; IIQd: 8,111.2 - 13,527.5) (Table 2).

**Table 1:** Distribution of the number of emergency dental visits, according to the periods before (April to December 2018 and 2019) and during the pandemic (April to December 2020) in Brazil.

| Rated Condition | Before | | During | | Total | |
|---|---|---|---|---|---|---|
| | n | (%) | n | (%) | n | (%) |
| Toothache | 8,921,543 | 70.5% | 3,736,851 | 29.5% | 12,658,394 | 100% |
| Dentoalveolar Abscess | 673,513 | 72.0% | 261,291 | 28.0% | 934,804 | 100% |
| Dentoalveolar trauma | 326,734 | 75.7% | 105,012 | 24.3% | 431,746 | 100% |
| Total | 9,921,790 | 70.7% | 4,103,154 | 29.3% | 14,024,944 | 100% |

**Table 2:** Difference between the medians of the number of monthly dental emergency attendances in Brazil between the periods before (April to December 2018 and 2019) and during the pandemic (April to December 2020).

| Conditions | Median (P25 – P75) | | Difference between medians (2020 -[2018 to 2019]) | % change 20 18 to 2019 | *P** |
|---|---|---|---|---|---|
| | 2018 2019 | 2020 | | | |
| Toothache | 448,802.00 (416,291.75 – 506,150,50) | 377,941.50 (310,251.00 – 454,206.50) | -70,860.50 | -15.79 | **0.049** |
| Dentoalveolar Abscess | 34,929.00 (30,215.00 – 37,870.50) | 27,705.50 (22,216.00 – 30,048.25) | -7,223.50 | -20.68 | **0.000** |
| Dentoalveolar trauma | 16,330.50 (14,800.00 – 18,472.75) | 10,975.00 (8,111.25 – 13,527.50) | -5,355.50 | -32.79 | **0.000** |
| Total | 499,046.50 (462,956.25 – 562,893.50) | 416,718.00 (341,764.75 – 497,822.75) | -82,328.50 | -16.50 | **0.031** |

*Mann-Whitney U for independent samples; P25: 25th percentile; P75: 75th percentile.

## DISCUSSION

The initial guidance of the Ministry of Health[5], based on global recommendation[11,12], was to prioritize urgent and emergency dental care in PHC after the installation of the pandemic[8]. Thus, as routine dental care was not available, it was expected that the number of urgent and emergency care services would increase in 2020[13,14]. However, it was possible to perceive a negative impact on the number of urgent dental care in PHC in Brazil.

This study brings that the pandemic of COVID-19 may have significantly impacted the demand behavior for dental care in the public service[13,15,16]. Other studies have pointed out similar results to ours[13,14,16-20] regarding the negative impact of urgent consultations.

In this study, it was pointed out that dental pulpal or periapical lesions, which cause tooth pain, would be the main reason for consultations, corroborating the literature[15,16,19,21,22], followed by abscess or cellulitis[14,19] and then trauma[13,15,19]. The pain of dental origin is pointed out as a significant predictor of service utilization during the pandemic[13].

In this study, the number of attendances with the condition dental trauma was the one that reduced the most during the period studied. It is worth pointing out that this condition ranges from a simple concussion (without urgency and severity) to the loss of the dental element[7]. Thus, it may be that some of these cases were considered elective, non-urgent care by the oral health team and, therefore, were not seen during the period when dental care was suspended[8]. Moreover, the pandemic brought the need for isolation of the population and caused the closure of establishments for sports and schools, reducing contact between people, and with this, there is the possibility of decreasing the occurrence of dental trauma.

Some factors have been pointed out in the literature related to the reduction in the number of dental appointments, such as uncertainties of the population regarding the offer of dental appointments, the redirection of professionals to other work fronts, the closing of offices due to the inadequacy of biosafety measures, besides the omission of the demand due to the population's fear of infection and also in the provision of services by professionals[13,14,17,23-25].

It is noteworthy that urgent care should occur the effective realization of dental procedures, not just medication and referral[7]. The treatment of urgent causes aims to meet the population's needs resolutely, with adequate first contact and, especially, reducing their suffering[7]. Thus, this type of care assumes an important role in moments of crisis, such as pandemics. It is important to consciously assure and agree with the users that this form of organization aims to facilitate the identification of priorities and to respond to all those who seek the unit, but the population and the service itself must understand that emergency care cannot be the only way to organize the Unit, in which everything will be translated as a priority, and the user must receive adequate care and full attention to his needs[7].

The restriction of care in public dental services can lead the population to opt for a quick resolution of the problem by extracting teeth, which is mutilating and impacts the quality of life of the patient and increases inequity in oral health. The most vulnerable populations are those who need SUS the most[16,17]. Other studies on public oral health services in Brazil show that the pandemic

is exacerbating regional inequalities, with significant barriers to access to health services for the most disadvantaged populations that may worsen existing inequalities[17], and this condition is also affecting oral health services[16,17]. Authors have already discussed that this impact may represent a serious setback for the improvement of epidemiological conditions in the oral health of the Brazilian population and may directly affect the advances achieved with oral health policies in recent decades[14,20].

PHC has been a strategy to reorganize the health model[2,4] and even though it has been pointed out as important to face the pandemic, the efforts and investments in Brazil were focused on hospital care[2,4,26]. Not valuing the importance of PHC in this pandemic moment may have been a mistake[2], because it is a strategic tool to combat COVID-19 and its unfoldings[26]. The failure of international experiences of attempts to confront the pandemic centered on individual hospital care alerted to the need for a more territory-based approach and the need to activate the PHC, in all its potentiality[2].

Understanding the context during the pandemic will be useful for predicting future needs in dental services. In agreement with the studies by Petrescu et al.[15] and Guo et al.[13], people's needs for dental services may likely grow explosively in the post-COVID-19 period. Management should implement comprehensive prevention and control measures in dental care[13,15], especially considering that lack of treatment carries the risk of serious sequelae[14]. There is a need for permanent evaluation, strategic organization, and planning of policies and actions for comprehensive care of dental emergency care and the repressed demand accumulated in the pandemic period.

Studies show that the use of teletrips[27-29] and teledontology[28,30] are effective initiatives for the management and control of emergencies and that in the context of PHC could also be adapted for preventive approaches, requiring greater investment in human and physical resources and additional equipment[20]. The approach that emphasizes prevention is an opportunity for the dental profession to move from being technicist and curative to promoting health. Adopting prevention and non-surgical management with a more minimally invasive and non-aerosolizing approach to caries will be critical during and after the pandemic[20].

The results of this study are significant mainly for analyzing dental care throughout the national territory, but it is necessary to present its limitations. The first is related to the nature of research with secondary data, which includes the quality of registration, and under- or over-reporting of data due to lack of registration. In addition, the reporting of these data may have been affected by the context of the COVID-19 Pandemic. While the quality of the registry may influence these data, it is important to emphasize that they are official information from the Brazilian Ministry of Health. The lack of evaluation of all surveillance conditions and the possibility of registering urgent consultations as elective PHC care can also be pointed out as weaknesses. The data analyzed were not collected specifically to answer the questions of this research and no differences between states and months were analyzed. It was also not possible to verify that emergency care faced different demands in distinct phases of the pandemic of COVID-19, as already pointed out in other international studies[23,31]. Additional longitudinal research on the impact of COVID-19 on dental emergency services should be conducted at different periods of the pandemic to verify specific needs and protect the efficient and safe provision of essential dental care.

In Brazil, significant reductions were observed in the performance of emergency dental procedures in PHC during the pandemic of COVID-19, being investigated here for toothache, abscesses, and trauma. The impact on consultations during the pandemic may make it difficult to guide the planning of actions for comprehensive treatment of users in the SUS, besides generating a large repressed demand. These data may help in the development of more resolutive oral health care policies and actions.

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