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The impact of the COVID-19 epidemic on the utilization of emergency dental services

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KEYWORDS
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Abstract *Background/Purpose:* To assess how the current COVID-19 epidemic influenced peoples' utilization of emergency dental services in Beijing, China.
Methods: The first-visit patients seeking emergency dental services before or at the beginning of the COVID-19 epidemic were retrieved. Their demographic characteristics and the reasons for visiting were recorded and analyzed.
Results: There were 2,537 patients involved in this study. Thirty-eight percent fewer patients visited the dental urgency at the beginning of the COVID-19 epidemic than before. The distribution of dental problems has changed significantly. The proportion of dental and oral infection raised from 51.0% of pre-COVID-19 to 71.9% during COVID-19, and dental trauma decreased from 14.2% to 10.5%. Meanwhile, the non-urgency cases reduced to three-tenths of pre-COVID-19.
Conclusion: Within the limitation of this study, the COVID-19 epidemic had a strong influence on the utilization of emergency dental services.

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Introduction

In December 2019, a series of pneumonia cases of unknown causes outbreaks in Wuhan, Hubei, China.[1] One month later, scientists isolated a novel coronavirus that was severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) other than SARS-CoV, MERS-CoV, avian influenza, influenza, and other common respiratory viruses.[2,3] Since its outbreak, China responded quickly and has taken proactive public health measures to combat the disease including intensive surveillance, epidemiological investigations, active treatment of confirmed and suspected patients, and cut off the routes of transmission. However, the case count from the virus has soared. Concerning the outbreak of SARS-CoV-2, WHO declared the disease as a Public Health Emergency of International Concern (PHEIC),[4] and it was named COVID-19.

The transmission routes, treatments, and outcomes of COVID-19 continually receiving much research attention recently. What is clear for now is that the mode of transmission is through contact and in the form of droplets[1] although airborne transmission has not been ruled out. Since late January 2020, the Chinese authorities recommended that people go to crowded places as little as possible to avoid cross-infection. On the other hand, people's fear of COVID-19, because of its novel and rapid transmission, make them reluctant to go to public places including medical and dental hospitals. The literature shows that many dental procedures produce aerosols and droplets that are contaminated with bacteria, viruses, and blood, and have the potential to spread infections to dental personnel and other people in the dental office.[5] The health authorities of some cities in China ordered the dental institutions to suspend general non-emergency dental treatment while providing emergency dental services only. Policy factors and personal considerations alike deterred patients from seeking dental care except in an emergency.

Therefore, a critical challenge is to determine how dental emergency institutions should respond to utilization changes in the general population created by the COVID-19 epidemic. In this study, we aimed to assess how the current COVID-19 epidemic influenced peoples' utilization patterns of emergency dental services in Beijing, China.

Materials and methods

A retrospective analysis was conducted in the present study which retrieved patients seeking emergency dental services in a public tertiary stomatological hospital that functions as one of the two 24-h emergency dental centers in Beijing, China. The test period of the COVID-19 epidemic was between 1 February and 10 February 2020 after the Chinese authorities announced the disease could be transmitted human-to-human that put the people on high alert in late January. The control period of pre-COVID-19 epidemic was between 1 January and 10 January 2020 when there was no policy factors or personal considerations about the epidemic. The patients' demographic characteristics and the reasons for visiting were recorded. Only the first-visit patients with a complete diagnostic record were involved in this study.

Continuous variables are presented as mean ± standard deviation (SD). Categorical variables are presented as *n*(%) and analyzed through SPSS Statistics, version 20.0 (IBM Corp., Armonk, NY, USA) using chi-square test. The significance level was set at 0.05.

Results

There were 2537 patients, 1242 females and 1295 males, involved in the present study, and their demographic characteristics were listed in Table 1. Thirty-eight percent fewer patients visited the dental emergency center at the beginning of the COVID-19 epidemic compared with one month ago (970 vs. 1570). The age of the patients was between 2 years and 92 years with the mean of (38.9 ± 19.3) years. There was no significant difference between the minors' proportion of the two periods ($P = 0.077$). There were more female patients than male patients pre-COVID-19. However, the situation was reversed during the COVID-19 epidemic ($P < 0.001$).

The dental pulpal or periapical lesions (44.7%) were the main reason for emergency visits, followed by cellulitis or abscess (14.2%), trauma (12.8%), and other problems. Although the total and per type patients' number declined when the fears of COVID-19 grew after the expansion of the epidemic, the distribution of dental problems has changed

Table 1 Demographic characteristics of patients who utilized emergency dental service before and during the COVID-19 epidemic ($n = 2537$).

	Total (*n*)	Age (*n* (%)[a] or mean ± SD[b])			Gender (*n* (%))	
		≤18 years	>18 years	Average (years)	Female	Male
Pre-COVID-19	1567	233 (14.9%)	1334 (85.1%)	37.5 ± 19.3	822 (52.5%)	745 (47.5%)
During COVID-19	970	120 (12.4%)	850 (87.6%)	41.2 ± 19.1	420 (43.3%)	550 (56.7%)

[a] Categorical variables are presented as *n* (%).
[b] Continuous variables are presented as mean ± standard deviation (SD).

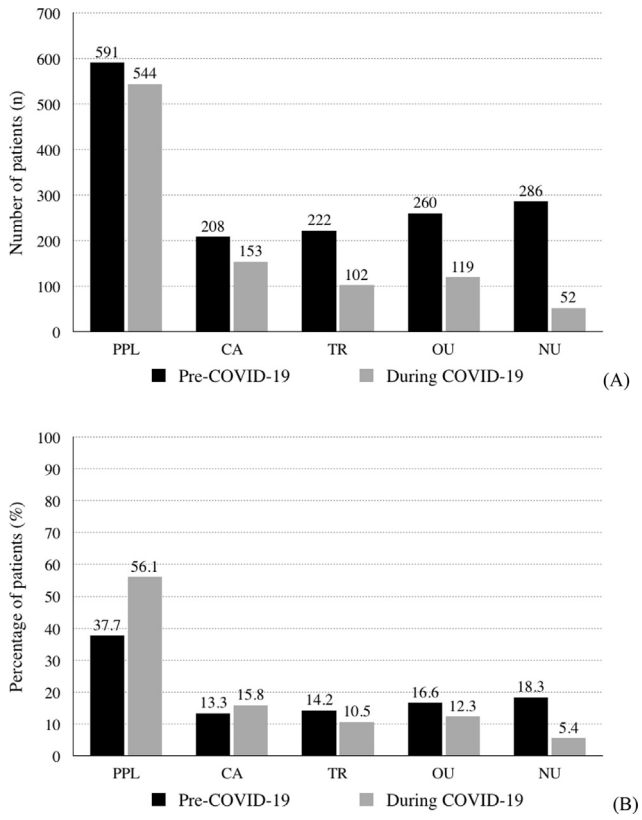

Fig. 1 Histogram showing the distribution of patients who utilized emergency dental service before and at the beginning of the COVID-19 epidemic ($N = 2537$). (A) Number of patients; (B) percentage of patients. PPL, dental pulpal or periapical lesions; CA, cellulitis or abscess; TR, trauma; OU, other urgencies; NU, non-urgencies.

significantly (Fig. 1). The proportion of dental and oral infection raised from 51.0% of pre-COVID-19 to 71.9% during COVID-19 and dental trauma decreased from 14.2% to 10.5%. Meanwhile, the non-urgency cases reduced to three-tenths of pre-COVID-19. There was a significant difference between the test and control periods ($P < 0.001$).

Discussion

This study applies a descriptive analysis to dental data in the special period and presents salient and meaningful findings of emergency dental visits. We observed significant utilization reductions in emergency dental services at the beginning of the COVID-19 epidemic. The results strongly suggest that COVID-19 significantly influenced people's dental care-seeking behavior.

As most of the routine dental care was not available during the epidemic, more patients were expected to seek emergency dental service when it was needed. However, according to the Chinese authorities' recommendations and fearing of epidemics, people are reluctant to go outside but stay in house, with less willing to go to dental institutions. As a result, the overall dental emergency patients count reduced by 38%. However, the previous study showed that there was a potential risk for transmission of acute viral respiratory tract infections in the dental office because of aerosol production during certain dental procedures.[5] Although the number of patients was reduced, it took a strongly prolonged time for the dental institution to carry out strict infection control measures. Consequently, the emergency center was unprecedented stressed. It was necessary to increase the dental units to meet the patients' need for emergency dental services.

There was no obvious difference between the overall number of men and women (1242 vs. 1295). According to a previous study, women sought dental emergency care significantly less often than men, and the ratio was reversed for non-emergency dental service.[6] In the present study, the ratio was 43.3% females to 56.7% males during the epidemic and 52.5% females to 47.5% males pre-COVID-19 (Table 1). It might be attributed that females were more apprehensive about undergoing dental treatment procedures because of acute viral respiratory tract infections than their male counterparts.[7] Meanwhile, the present study observed some patients who were not in an emergency (18.3%) went to the dental emergency center before the COVID-19 epidemic. That could be attributed that the dental emergency center is convenient to care accessibility for a population with difficulty in accessing general dental services, and the basic dental fees are the same regardless of the type of practice (elective/urgency) in China. The free walk-in services may encourage consultations for non-urgent reasons.[8] In contrast, most of the visitors (94.6%) during the epidemic were in an emergency. However, the present study didn't evaluate the cases by urgency levels which may affect people's demand for dental services at different periods.

Dental pulpal or periapical lesions, and cellulitis or abscess, were the most common reason for patients' visits to the emergency center in this study, which was similar to the findings of previous literature.[6] The results were because of the facts that many Chinese residents had poor both oral health status and oral health behavior habits.[9] In the present study, even fearing the COVID-19, people have to seek emergency dental services when suffering from severe toothache, trauma, and cellulitis or abscess. At the same time, as social and conventional activities were suggested to be limited by the authorities, both the amount (102 vs. 222) and percentage (10.5% vs. 14.2%) of trauma decreased with reduced outdoor activities. Meanwhile, fewer non-urgency cases were identified within the emergency dental center at the beginning of the epidemic than pre-COVID-19.

Although most of the public attention is focusing on the direct causes and control measures of COVID-19, possible health consequences resulting from people's fears of it should not be overlooked. Understanding the presents situation is helpful in terms of predicting future dental needs. Based on the results of this study, we have reasons to speculate that people's requirements for dental services might grow explosively in the post-COVID-19 period. The strengths of administrative departments of the government are suggested to be coordinated to implement comprehensive prevention and control measures in future dental care. However, there should be further studies about the real state of long-term dental services influenced by the

COVID-19 epidemic owing to the present limited data collected.

Within the limitation of this study, our results suggest that the COVID-19 epidemic has a strong influence on emergency dental services. The number of emergency dental visitors reduces, the proportion of dental and oral infection increases and those of dental trauma and non-urgency decrease at the beginning of COVID-19 epidemic.

Declaration of Competing Interest

The authors have no conflicts of interest relevant to this article.

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