

# Impacts of the COVID-19 epidemic on the department of stomatology in a tertiary hospital: A case study in the General Hospital of the Central Theater Command, Wuhan, China

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## Abstract

**Objective:** The impact of the worldwide COVID-19 pandemic on the dental community is evident. Dental education programmes and academic activities have suffered from the ramifications of the pandemic. This study aimed to depict the impacts of the COVID-19 epidemic on the clinical services and academic activities in the department of stomatology of a tertiary hospital in Wuhan, China.

**Methods:** We obtained historical data of the Department of Stomatology from the Health Information System of the General Hospital of Central Theater Command, Wuhan, China between January 2018 and June 2020. Mean, standard deviation and median with interquartile range were used to summarize the variables. Line plots were used to illustrate the temporal trend. The Kruskal-Wallis equality-of-populations rank test was used to compare the difference between groups.

**Results:** A significant decrease was noted in the monthly average number of patients seeking outpatient services for the year 2020, which were decreased by two-thirds from 2018 to 2020. The number of emergency cases also decreased significantly by 57.6% in 2020. The monthly number of teaching hours decreased from  $3.8 \pm 1.5$  in 2018 and  $4.7 \pm 1.4$  in 2019 to  $1.7 \pm 1.9$  in 2020. The number of interns also decreased by more than 77.0% in 2020.

**Conclusions:** The impacts of COVID-19 in the stomatology clinic were significant with notable decreases in clinical services and education offered to the stomatology students. There is a need to find solutions to keep as many dental professionals as needed remaining on the frontline of oral health care.

## KEYWORDS

COVID-19, dental education, dental practice, dentistry, infection control, public health

Qingshan Dong and Angelica Kuria contributed equally to the study.

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## 1 | INTRODUCTION

As a public health emergency of international concern, the severe acute respiratory syndrome coronavirus 2 (COVID-19) pandemic has resulted in millions of confirmed cases and deaths worldwide.<sup>1,2</sup> According to the current evidence, the COVID-19 virus is primarily transmitted between people through respiratory droplets and person-to-person contact routes.<sup>3,4</sup> Dental patients who cough, sneeze, or receive dental treatment including the use of high-speed handpieces or ultrasonic instruments make their secretions, saliva, or blood aerosolize to the surroundings.<sup>5</sup> Due to the characteristics of dental settings, the risk of cross-infection may be high between dental practitioners and patients, and dental practitioners are at high risk of acquiring an infection while treating patients.<sup>6</sup> The impact of COVID-19 on the dental community is evident. Dental education programmes and academic activities have also suffered from the ramifications of the pandemic. The big challenge is how we can maintain sufficient dental personnel despite the outbreak.<sup>6,7</sup>

Because of the nature of dental outpatient treatment, dentists and patients have very close contact for long periods of time. The high-speed turbine handpieces, oral curettes and stomatological equipment used in treatment may generate a large number of spray droplets and aerosols. However, conventional protective measures cannot effectively prevent the spread of the virus. If a patient conceals his/her infection, or he/she is still in incubation period patients and is not aware of the infection during the visit or treatment, it would result in transmission. On 23 January 2020, the central government of China imposed a lockdown in Wuhan and other cities in Hubei province. The COVID-19 Prevention and Control Headquarter of Hubei Province issued a notice four days after the city lockdown (January 27, 2020) informing the dental clinics and dental departments of general hospitals to retain only necessary emergency services, strictly implement in-hospital infection control following the level 3 protection guideline, and suspend all other optional visits and treatments.

On 21 February 2020, the Chinese Society of Stomatology, the Chinese Dental Foundation, the National Dental Quality Control Center of China and the Stomatologist Branch of the Chinese Medical Association jointly composed and issued the 'Protection Manual for Oral Healthcare Institutions of Novel Coronavirus Pneumonia', while each branch under the Chinese Society of Stomatology put forward their own guidance, such as 'Prevention and Treatment of Mucosal Diseases during the Novel Coronavirus Pneumonia Epidemic', 'Expert Advice on Prevention and Care of Mucosal Diseases during the New Coronavirus Pneumonia Epidemic', 'Expert Advice on Emergency Dental Treatment during the Prevention and Control Phase of the New Coronavirus Pneumonia Epidemic', 'Advice on Prevention and Control of Dental Outpatient Treatment during the New Coronavirus Pneumonia Epidemic' and 'Psychological Intervention for Dental Patients during the New Coronavirus Pneumonia Epidemic'. At the same time, these organizations also prepared 'Oral Healthcare Q&A during the Prevention and Control Phase of the New Coronavirus

Pneumonia' and organized experts of oral health care to improve the public's oral health awareness and common disease management awareness.<sup>8,9</sup>

The General Hospital of the Central Theater Command is one of the teaching hospitals of the Southern Medical University of China and one of the largest tertiary hospitals in Wuhan, where the COVID-19 epidemic broke in China. There is a total of 60 personnel in the Department of Stomatology of the hospital, including 34 stomatologists, 22 nurses and 4 technicians. Fortunately, there was no personnel infected by COVID-19 during the epidemic in Wuhan because they strictly followed the Protocol for Prevention and Control of COVID-19 of the Chinese Center for Disease Control and Prevention throughout the epidemic.<sup>10,11</sup>

Wuhan has been gradually reopened since 1 April 2020.<sup>12</sup> The aim of this study was to depict the impacts of the COVID-19 epidemic on the clinical practices and academic activities of the department by examining data from January 2018 to June 2020.

## 2 | METHODS

We obtained historical data of the department from the Health Information System of the General Hospital of the Central Theater Command, Wuhan, China. The data were in monthly statistics and grouped into three broad categories (clinical services, education and academic activities/communication) between January 2018 and June 2020 to determine the impacts of COVID-19 on the department. Variables under clinical services included the numbers of outpatient cases, emergency cases, operation cases, hospitalization and discharge of patients; numbers of interns and teaching hours were variables under education, while the numbers of people attending scientific conferences, lectures given by the personnel of the department, personnel study outside and outside visitors to the department were variables for academic activities. Line plots were used to illustrate the temporal trend of the variables during the study period. Mean, standard deviations and medians with interquartile range were used to summarize the variables. The Kruskal-Wallis equality-of-populations rank test with Holm-Šidák adjustment was used to compare the difference between the medians of the variables during the same period, that is from January to June, in 2018, 2019, and 2020. All the analyses were conducted in Stata 16.1 (StataCorp, College Station).

Only aggregated data were used in the analysis, and no private and confidential information was disclosed; therefore, ethical approval was not applicable.

## 3 | RESULTS

### 3.1 | Clinical services

There was a statistically significant decrease in the number of patients seeking clinical services in the stomatology clinic beginning

January 2020. The month of February 2020 recorded almost zero patients in all variables for clinical services. Figure 1 shows a continuous trend of all the clinical services until January 2020 when a decrease began. However, from April 2020, an increase in the number of patients was observed again. The monthly number of patients seeking outpatient services between January and June decreased by two-thirds, which are  $3561.3 \pm 419.2$  in 2018,  $3996.2 \pm 579.2$  in 2019 and  $1222.4 \pm 1106.8$  in 2020 (Table 1). The number of emergency cases of the department also significantly decreased by 57.6%, from a monthly number of  $125.2 \pm 17.8$  in 2018 to  $45.3 \pm 18.6$  in 2020. Table 1 compares the median numbers of all clinical services in the three years, and statistically significant differences are noted in all variables when comparing the year 2020 with the years 2018 and 2019.

### 3.2 | Education

There is a decreasing trend for teaching hours and the number of interns in the year 2020. This decrease was noted from January 2020 (Figure 2). The monthly number of teaching hours decreased by 60%, from  $3.8 \pm 1.5$  in 2018 and  $4.7 \pm 1.4$  in 2019 to  $1.7 \pm 1.9$  in 2020. The number of interns also decreased by 77%, from a monthly number of  $20.5 \pm 9.2$  in 2018 and  $29.0 \pm 10.1$  in 2019 to  $5.7 \pm 4.5$  in 2020. Table 1 compares the medians of the education variables from January to June of the year 2020 with those of the years 2018 and 2019. Statistically significant differences were observed between the years 2020 and 2019.

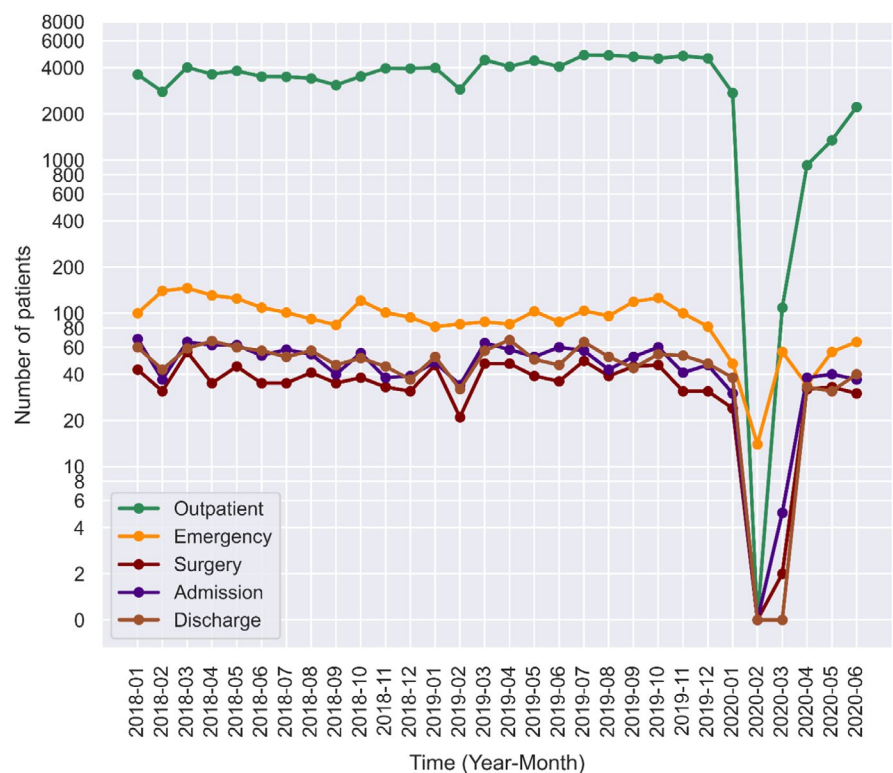
### 3.3 | Academic Communication

Because academic activities/communication is usually undertaken in summer and autumn and much fewer take place in other seasons; in general, there was no statistically significant difference found across the three years (Table 1).

## 4 | DISCUSSION

Stomatology clinics are among the departments in the health sector that may be severely affected by infectious diseases that are mostly transmitted by respiratory droplets. COVID-19 is one of the diseases, which is mainly due to the nature of dental interventions and the proximity of the dental care provider to the oral region of the patient.<sup>6,13</sup> Our study indicates a significant decrease in the number of patients seeking dental services in the studied hospital during the COVID-19 epidemic in 2020 in Wuhan, and education offered to the stomatology students was decreased significantly during the same period. Meanwhile, as shown in Figure 1, practically all activities in the Department of Stomatology have tended to return to normal after three months. The same pattern can be seen across the whole city and throughout China. At the present time, access to oral health services would not be a problem in China. This achievement may be mainly attributed to the strict control measures taken in Wuhan city to fight against COVID-19, which resulted in a rapid and dramatic decline of  $R_0$  (ie the basic reproduction number, which is the expected number of cases directly caused by one infected case in

**FIGURE 1** Time trend of the clinical services from January 2018 to June 2020. Note: Admission, number of patients admitted to the hospital staying at least 24 h to receive necessary treatment; Discharge, number of patients who stay at hospital at least 24 h leaving hospital; Emergency, number of patients suffering from sudden disorders or sudden changes in existing medical conditions outside of opening hours; Outpatient, number of patients attending a hospital for treatment without staying there overnight; Surgery, number of patients receiving stomatological operations to remove or replace diseased organs and/or tissues [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



**TABLE 1** Comparison of clinical services, education and academic activities from January 2018 to June 2020

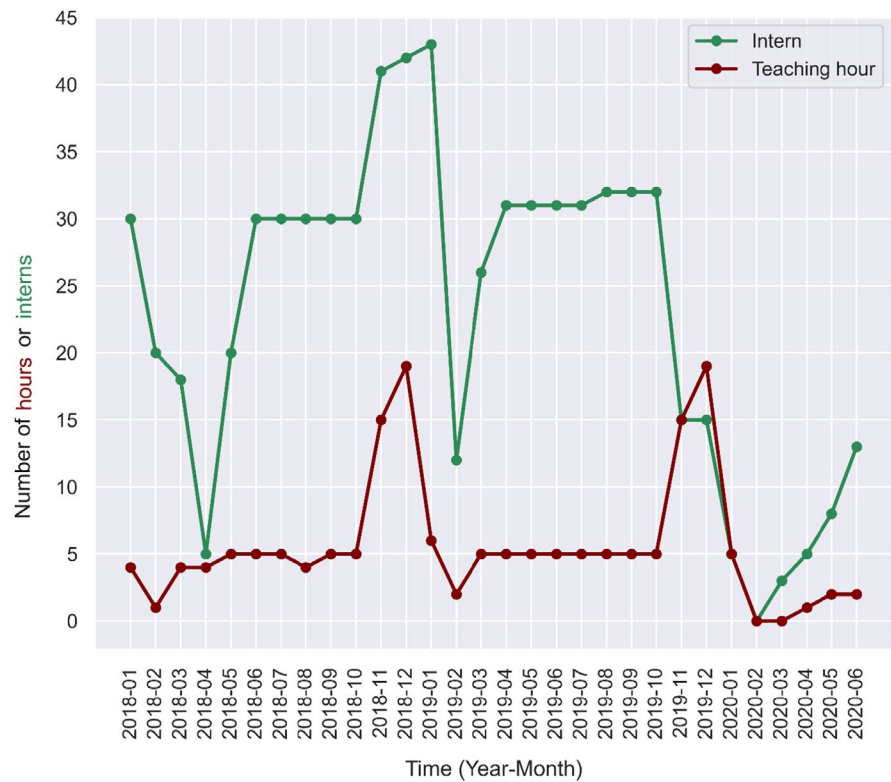
| Variable           | Mean (SD)      |                | Decrement <sup>a</sup> (%) | Median (Q1-Q3) |                        | Holm-Sidak adjusted P-value <sup>b</sup> |                       |        |        |
|--------------------|----------------|----------------|----------------------------|----------------|------------------------|--|-----------------------|--------|--------|
|                    | 2018           | 2019           |                            | 2018           | 2019                   | Compared with 2018                       | Compared with 2019    |        |        |
| Outpatient         | 3561.3 (419.2) | 3996.2 (579.2) | 1222.5 (1106.8)            | 68.6           | 3620.5 (3500.0-3812.0) | 4071.0 (3996.0-4450.0)                   | 1135.5 (109.0-2217.0) | 0.023  | <0.001 |
| Emergency          | 125.2 (17.8)   | 88.5 (7.4)     | 45.3 (18.6)                | 57.6           | 128.0 (109.0-140.0)    | 86.5 (85.0-88.0)                         | 51.5 (34.0-56.0)      | <0.001 | 0.045  |
| Operation          | 40.8 (9.1)     | 39.3 (10.1)    | 20.2 (15.2)                | 49.6           | 39.0 (35.0-45.0)       | 42.5 (36.0-47.0)                         | 27.0 (2.0-32.0)       | 0.020  | 0.016  |
| Admission          | 57.8 (11.4)    | 52.7 (10.8)    | 25.0 (17.8)                | 54.8           | 62.0 (53.0-65.0)       | 55.0 (48.0-60.0)                         | 33.5 (5.0-38.0)       | 0.005  | 0.042  |
| Discharge          | 57.5 (7.7)     | 50.7 (11.7)    | 23.8 (18.4)                | 56.0           | 59.5 (57.0-60.0)       | 51.0 (46.0-57.0)                         | 32.0 (1.0-38.0)       | 0.002  | 0.028  |
| Interns            | 20.5 (9.2)     | 29.0 (10.1)    | 5.7 (4.5)                  | 77.0           | 20.0 (18.0-30.0)       | 31.0 (26.0-31.0)                         | 5.0 (3.0-8.0)         | 0.050  | 0.002  |
| Teaching_hours     | 3.8 (1.5)      | 4.7 (1.4)      | 1.7 (1.9)                  | 60.0           | 4.0 (4.0-5.0)          | 5.0 (5.0-5.0)                            | 1.5 (0.0-2.0)         | 0.140  | 0.012  |
| Conference_persons | 0.0 (0.0)      | 0.7 (1.6)      | 0.0 (0.0)                  | 100.0          | 0.0 (0.0-0.0)          | 0.0 (0.0-0.0)                            | 0.0 (0.0-0.0)         | 0.500  | 0.209  |
| Lectures           | 0.0 (0.0)      | 0.2 (0.4)      | 0.0 (0.0)                  | 100.0          | 0.0 (0.0-0.0)          | 0.0 (0.0-0.0)                            | 0.0 (0.0-0.0)         | 0.500  | 0.296  |
| Study_outside      | 1.0 (0.0)      | 1.8 (0.4)      | 1.3 (0.5)                  | 7.1            | 1.0 (1.0-1.0)          | 2.0 (2.0-2.0)                            | 1.0 (1.0-2.0)         | 0.125  | 0.083  |
| Visitors           | 0.2 (0.4)      | 0.2 (0.4)      | 0.0 (0.0)                  | 100.0          | 0.0 (0.0-0.0)          | 0.0 (0.0-0.0)                            | 0.0 (0.0-0.0)         | 0.337  | 0.461  |

Abbreviations: Q1, the first quartile; Q3, the third Quartile; SD, standard deviation.

<sup>a</sup>Calculated as the values of the 2020 divided by the mean values of 2018 and 2019 and multiplied with 100%.

<sup>b</sup>Kruskal-Wallis equality-of-populations rank test was used.

**FIGURE 2** Time trend of the education from January 2018 to June 2020. Note: Intern, number of dental internships; Teaching hour, number of hours spent teaching a group or class of students according to the formal policy of higher education in China [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]



a population) from 2.35 to 1.05 in the 2 weeks after the epidemic started.<sup>14</sup>

The reduction of oral healthcare services and demands has been seen and has raised concern around the world. The recent identification of COVID-19 in saliva has also intensified the need for strict and effective infection control protocols for hospitals and dental practices in areas that are affected by COVID-19.<sup>15</sup> A study conducted in Beijing, China, indicated that overall dental emergency patients reduced by 38% in February 2020 as most of the routine dental care was not available during the epidemic.<sup>16</sup> In Italy, stomatologists worried that the diagnosis of oral cancer was delayed by the outbreak of the COVID-19. In the Inter-departmental Research Center (CIR) Dental School of the University of Turin, there was only one case of oral squamous cell carcinoma in 45 working days in the pandemic, while approximately 7 new cancer cases were usually expected during the same period before the pandemic.<sup>17</sup> In Brazil, the pandemic caused universities to close, and the demand for the pathology service decreased considerably. The comparison between the same periods (March, April, and May) of the years 2019 and 2020 indicated a decrease of 68.8% in mouth biopsies in all Brazilian regions with all regions showing a decline of over 60%, which raised concern that the diagnosis of oral diseases was delayed and patients would accumulate during this period.<sup>18,19</sup>

During the COVID-19 epidemic in Wuhan, the knowledge of the disease was very limited, and there were no specific recommendations on dental healthcare services from the World Health Organization. The dental healthcare institutions in China mainly relied on a series of guidelines regarding treatment and diagnosis of dental diseases for institutions and the general public issued by the

Chinese Health Commission, and the Chinese Dental Association as well as its subordinate organizations. Until 3 August 2020, the World Health Organization issued the interim guidance about considerations for the provision of essential oral health services in the context of COVID-19, which advises that routine non-urgent oral health care should be suspended until there has been a significant reduction in COVID-19 transmission. In addition, where possible, patients should be screened before they visit hospitals, and both oral healthcare personnel and patients should take sufficient protection measures during treatment.<sup>20</sup> A comprehensive collection of guidance of oral health services in the context of COVID-19 for the oral and dental care team was compiled later and can be found online.<sup>21</sup>

In the Department of Stomatology, to protect the dentist and nurse and reduce the virus spread and infection, according to the prevention and control requirements, no bracelets (chains), watches, rings and other items could be worn during work, and strict personal protective measures were taken. Furthermore, medical-surgical masks, disposable work caps, latex gloves, goggles or protective face screens and work clothes were used during routine dental treatment. The dentists and nurses used medical protective masks (KN95/N95), disposable work caps, latex gloves, goggles or protective face screens, disposable isolation gowns and disposable shoe covers when performing operations that may result in splashing to protect skin and mucous membranes from blood or secretions of potentially infected patients. During the epidemic, operations that may produce droplets or aerosols were avoided or minimized; when operations resulting in splashing had to be performed, the 'one person, one consultation room' rule was followed. Before any operation, patients used an antibacterial mouthwash to

reduce the number of microorganisms in the mouth; during operations, four-handed operations were coordinated; strong and weak suction devices were used to reduce the production of droplets or aerosols; and rubber barriers were used as much as possible. Strict implementation of hand hygiene was taken, such as non-clean hands would not touch the mouth, nose, eyes, etc. A radiological examination was based on curved tomography and cone-beam computed tomography (CBCT), and dental filming was avoided as much as possible.

Wuhan City closed the Stomatology departments or clinics on January 27, and other cities of Hubei province closed the Stomatology facilities at different times according to the status of their respective epidemics. During the Wuhan lockdown period, the routine outpatient and inpatient oral healthcare services were suspended; however, the emergency care and treatment were maintained. The Department of Stomatology studied here suspended routine outpatient and inpatient care from January 27 to March 24 (which was shorter than the whole city lockdown period), and some other stomatological institutions remained closed until the end of April or early May. Patients were divided into febrile patients and non-febrile patients. Non-febrile patients with oral emergencies visited the emergency dental department directly, while febrile patients were first screened by the hospital fever clinic to exclude the new coronary pneumonia virus infection and then referred to the emergency dental department for treatment.

Despite emergent dental care and emergency centres in general hospitals remaining open during the epidemic, according to our case study, all the clinical services and education in the stomatology clinic were significantly affected since the beginning of the epidemic in Wuhan. The most significant impacts happened in February 2020 when almost zero patients were recorded in the number of outpatients, emergency services, operations and hospitalization. Although the decline in the number of patients seeking services was expected after the emergence of the epidemic due to the public's fear and recommendations from the government of China to stay indoors,<sup>6,12</sup> reports of the first human to human transmission seem to have also severely affected these services as this was first reported in late January 2020.<sup>22</sup> Our study, in conjunction with other studies, shows that during the epidemic, the clinical services in stomatology clinics were severely affected.<sup>6,13,16</sup>

A recently published study indicated that during three months (January to March 2020) of the COVID-19 outbreak, deaths in Wuhan significantly increased by 56%. The excess mortality rates were greater in central than suburban districts and coincided with the increase and decrease of the COVID-19 epidemic. Outside of Wuhan, however, no increase was found in overall mortality.<sup>23</sup> Almost during the same period, we observed the dramatic reduction in hospital visits for oral health care in our study. The reduction of hospital visits and admissions in the current study is mainly due to limited oral healthcare services available and the travel restriction during the lockdown, and people's worry of being infected in a hospital environment. Unless an emergency, people would not go to hospitals for non-essential and non-urgent conditions. We do not

have specific statistics regarding the types of dental visits in our hospital, but according to the statistics of other hospitals in Wuhan, the majority of oral emergency patients are suffering from maxillofacial trauma, followed by pulpitis and periapical inflammation, interstitial infection, and pericoronitis, temporomandibular joint dislocation, oral ulcers and gingival bleeding.<sup>24</sup>

To avoid and reduce infection and transmission, it is necessary to communicate with and educate non-emergency dental patients through phone or online solutions. Teledentistry, a combination of telecommunications and dentistry, has seen an increased application in recent years. Teledentistry involves the exchange of clinical information and images over remote distances for dental consultation and treatment planning, which may improve the accessibility and delivery of oral health care, lower its costs, and reduce its disparities between rural and urban communities.<sup>25</sup> Real-time teleconsultation that involves a videoconference in which dental professionals and their patients may see, hear and communicate with one another without a physical meeting is a way to diagnose and treat patients while limiting the spread of COVID-19.<sup>26</sup> When dentists conduct online consultations for special cases, they need to consider both the patient's psychological states and their oral diseases, and give relevant advice from the perspective of calming the patient to reduce the impacts of psychological factors on oral health. For patients with oral emergencies, such as sudden tooth pain, dental trauma, oral bleeding and oral infection, they need to be treated in the emergency department. During the epidemic, the dental clinics and dental departments of public hospitals in China retain emergency care under strict infection control conditions. For the oral healthcare personnel who participate in emergency care, in addition to taking the correct protective measures to do a good job of triage and sensory control, they also should proactively learn the possible stress reactions, early identify risks, improve communication skills with patients and take sufficient self-protection. For oral healthcare institutions, it is necessary to strengthen the training of psychological knowledge for healthcare personnel in general, fully understand the psychological needs of patients and common stress reactions, practice doctor-patient communication skills and strengthen security measures meanwhile during emergency care to reduce the occurrence of violence in medical settings to the minimum extent.

In the COVID-19 pandemic, face-to-face classroom educational activities with dentistry students were nearly interrupted worldwide. School calendars and schedules were affected; licencing examinations were delayed or cancelled, and graduation ceremonies were delayed, cancelled or moved online. Virtual alternatives have been used to continue teaching and learning in dental schools.<sup>27</sup> In a recent survey in Europe, 90% of dental schools reported using online pedagogical software tools, 72% used live or streamed videos, 48% provided links to further online materials, 65% participated in organizing virtual meetings and, less frequently, small-scale working groups, social media groups or journal clubs.<sup>28</sup> In the United States, dental schools have had to manage the increasing anxiety among students, faculty and patients. Oral healthcare providers

need to educate and enforce the need to flatten the curve of the pandemic, in order to avoid overwhelming hospitals with a large flux of patients. The American Dental Education Association (ADEA) has taken the lead with regard to recommendations for teaching modalities like online education and other creative teaching methods, connecting faculty and administrators to share ideas.<sup>29</sup> In China, especially in Wuhan, education-related challenges for medical and dental schools, as well as their affiliated hospitals, are also significant. According to a national survey, 97% of the respondents have opened online courses during the COVID-19 epidemic in China, and 74% of 42 dental colleges and universities in mainland China delivered teaching online.<sup>30</sup>

In the Department of Stomatology, dental education was affected by a decline in the number of teaching hours and the number of interns compared with other years. The limited teaching and internships mean that dental students have not had enough time for clinical practice, which has an impact on building their ability for future clinical jobs. In response to the impact of the COVID-19 epidemic on the new term beginning in 2020 of colleges and universities and campus teaching, the Chinese Ministry of Education issued the 'Guidance on the Organization and Management of Online Teaching in Ordinary Higher Education Institutions during the Epidemic Prevention and Control Period' on 5 February 2020, which recommended a government-led, university-led and socially participatory approach to jointly implement and guarantee online teaching in colleges and universities during the epidemic. The guidance required colleges and universities to make full use of online resources and high-quality online teaching techniques, and actively carry out online teaching activities such as online lectures and online learning with the support of catechism platforms and practice platforms. Existing smart devices and applications have already made it possible for students to listen to and review lectures whenever and wherever possible. Relying on various online courses and platforms at all levels and online learning forums, the colleges and universities should try their best to ensure the teaching progress and quality, and realize the goal of 'Suspending Classes Without Stopping Learning'.<sup>31</sup> Although practical sessions have been the preferred teaching format in the studied department, online sessions have also shown promising results as reported by Liu et al.<sup>32</sup>

In conclusion, the impact of COVID-19 on the Department of Stomatology has been significant with a decrease in both clinical services to patients and educational opportunities offered to the stomatology students. To mitigate the negative impacts of the epidemic on the stomatology clinics, it has been necessary to review all guidelines and protocols of the clinics, integrate strategies related to patient management and infection control, and use new technologies for virtual contact with patients to minimize risk of infection.<sup>33</sup> At the same time, we need to encourage people to continue to seek oral healthcare services and, as a result, keep as many dental professionals as needed on the frontline of oral health care.

#### CONFLICT OF INTEREST

No conflict of interest to report.

#### AUTHOR CONTRIBUTIONS

Yang Cao and Qingshan Dong involved in conceptualization. Yanming Weng and Yu Liu performed data curation. Yang Cao and Angelica Kuria formally analysed the study. Yang Cao, Qingshan Dong, Yanming Weng and Yu Liu investigated the study. Yang Cao and Angelica Kuria involved in methodology. Yang Cao supervised the study. Qingshan Dong involved in validation. Yang Cao and Angelica Kuria involved in visualization. Angelica Kuria and Yang Cao wrote the article. Qingshan Dong, Yang Cao, Angelica Kuria, Yangming Weng and Yu Liu wrote, reviewed and edited the article.

#### DATA AVAILABILITY STATEMENT

All relevant data are within the manuscript.

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