

Impact of citywide COVID-19 testing on people's behaviour in seeking for dental services in Wuhan

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Cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of the coronavirus disease 2019 (COVID-19), which were epidemiologically linked to a seafood market, were first reported in Wuhan, Hubei Province, China, in late December 2019 (Wu, Wu, Liu, & Yang, 2020). COVID-19 was then officially declared a pandemic by the World Health Organization (WHO) on 11 March 2020 because of its high contagiousness and widespread (WHO, 2020). Routine dental practices have been suspended or seriously affected in Wuhan during the outbreak of COVID-19 (Meng, Hua, & Bian, 2020).

To control the epidemic, China has conducted strict measures and the current daily new COVID-19 cases in China have reached very low levels (Liu et al., 2020). Despite having wrested its epidemic under control, China remains on high alert for sporadic infections, especially among people in Wuhan, the former epicentre of China. During 14 May to 1 June 2020, the Wuhan government tested nearly 9.9 million residents for coronavirus infection. No confirmed cases were found, 300 asymptomatic infected persons were detected (with a detection rate of 0.303/10,000), and 1,174 close contacts were traced (Health Commission of Hubei Province, 2020). The citywide nucleic acid testing had affected many aspects of the city's management, including dental services. Thus, the purpose of our study was to investigate the people's dental care-seeking behaviour before and after the citywide rapid COVID-19 testing campaign in Wuhan.

The study has been approved by the Ethics Committee of the School & Hospital of Stomatology, Wuhan University (WHUSS, No. 2020B42). A retrospective analysis was conducted on patient

attendance at WHUSS before and after citywide COVID-19 testing, including the headquarter and 14 satellite clinics of the hospital located in Wuhan. The period before citywide rapid COVID-19 testing campaign was 2 weeks before testing, that is, from 30 April and 13 May 2020, and the period after citywide rapid COVID-19 testing campaign was 2 weeks after testing, that is, from 2 June and 15 June 2020.

Categorical variables were presented as *n* (%) and analysed using chi-square test. All statistical analyses were performed using SPSS 20.0 (IBM Corp, Armonk, NY).

One hundred and twenty-one per cent more patient attendance was noticed 2 weeks after the citywide COVID-19 testing compared with 2 weeks before the testing (11,466 versus 25,404). The age and gender distribution of the patients is demonstrated in Table 1. The proportion of most adult patient groups have risen after the citywide COVID-19 testing campaign. The portion of the elder age group of more than 64 years old has risen from 7.69% to 8.92%.

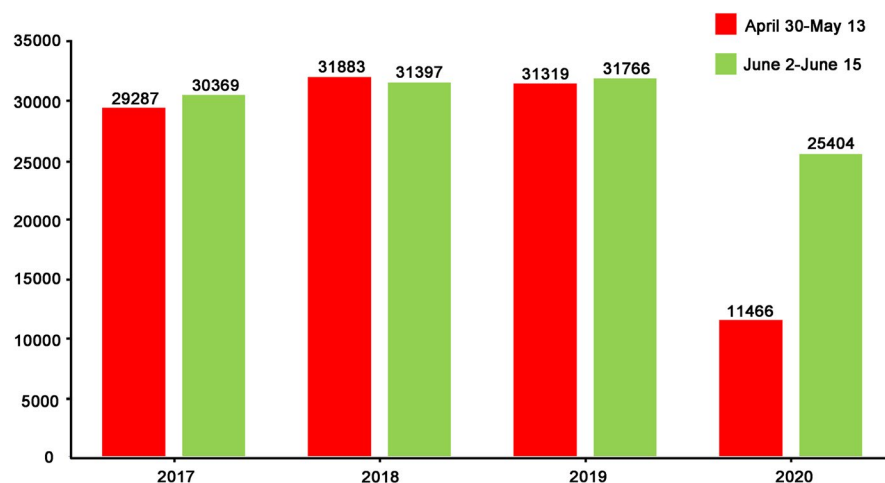
The patient attendance in the periods of April 30 to May 13 and June 2 to June 15 from 2017–2020 is presented in Figure 1. There was a dramatic reduction in patient attendance during April 30 to May 13 in 2020 compared with the same period in 2017, 2018 and 2019. However, the patient attendances have significantly increased after citywide COVID-19 testing in 2020. In terms of the patient attendance by specialty, the occupation ratio between a period in 2020 and the same period in 2019 was substantially higher between June 2 and June 15 than that between April 30 and May 13 in all seven departments (Table 2).

Jingjing Yu and Fang Hua contributed equally to this work.

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TABLE 1 Age and gender distribution of patients at WHUSS 2 weeks before and after the citywide COVID-19 testing in Wuhan

	April 30–May 13		June 2–June 15	
	Pre-COVID-19 testing		Post-COVID-19 testing	
	n	%	n	%
Age				
<6	310	2.70	658	2.59
6 ~ 19	2,389	20.84	4,531	17.84
20 ~ 34	4,093	35.70	9,108	35.85
35 ~ 44	1,474	12.86	3,271	12.88
45 ~ 64	2,318	20.22	5,569	21.92
≥65	882	7.69	2,267	8.92
Gender				
Female	6,425	56.04	14,894	58.63
Male	5,041	43.96	10,510	41.37

FIGURE 1 Patient attendance for the years 2017, 2018, 2019 and 2020 in the periods of April 30–May 13 and June 2–June 15**TABLE 2** Patient attendance at each department in the headquarter of WHUSS 2 weeks before and after the citywide COVID-19 testing in Wuhan, and the occupation ratios of patient attendances 2 weeks before and after testing and the corresponding periods in 2019

Department	30 April 2020–13 May 2020		2 June 2020–15 June 2020	
	n	Occupation ratio (%) ^a	n	Occupation ratio (%) ^b
Cariology and Endodontics	1,663	51.87	2,715	79.55
Orthodontics	1,414	45.45	2,771	80.44
Oral and maxillofacial surgery clinic	1,147	40.39	2,343	77.74
Prosthodontics	625	37.14	1,162	62.01
Paediatric Dentistry	618	44.78	854	56.86
Periodontics	528	23.22	1,382	64.94
Implant	227	34.71	661	98.80

^aOccupation ratio between 30 April to 13 May 2020 and the same period in 2019.^bOccupation ratio between 2 June to 15 June 2020 and the same period in 2019.

This study presented meaningful insights into the differences in patient attendance at WHUSS before and after the citywide rapid COVID-19 testing campaign in Wuhan. The public tertiary dental

hospitals were the most representative of Chinese dental health services (Yang, Zhou, Liu, & Tan, 2020), and WHUSS is a public tertiary dental hospital and the biggest dental hospital located in Wuhan. Although the lockdown of Wuhan has been released on 8 April 2020, patient attendance at WHUSS after the lockdown release and before the citywide COVID-19 testing (from 30 April to 13 May 2020) was still far from that of the same period in 2019 in our study. However, the number of patient attendance at WHUSS rose considerably after the citywide COVID-19 testing campaign in Wuhan, including the elder group of more than 64 years that was considered to be associated with poorer prognosis of COVID-19 (Chen et al., 2020; Wang et al., 2020).

People's fear of COVID-19, because of its novel and rapid transmission, made them reluctant to go to medical and dental hospitals (Guo, Zhou, Liu, & Tan, 2020), and the citywide COVID-19 testing campaign in Wuhan showing only 300 asymptomatic infected persons seemed to restore the confidence of patients in seeking for dental services. A previous study indicated that the coronavi-

rus pandemic has an impact on orthodontic appointments (Cotrin et al., 2020). In our study, the patient attendance in the Department of Implant and the Department of Orthodontics has almost reached

the same levels compared with those of previous year at 98.80% and 80.44%, respectively, after citywide COVID-19 testing, which reflected the people's demands for dental healthcare services of non-urgent reasons during the post-COVID-19 era.

The citywide testing campaign provided useful information for the establishment of community partnerships, adequacy of referral systems and the balance between targeted and routine screening in dealing with infectious disease (Castel et al., 2012). Our study indicated that the testing campaign also has a strong positive impact on the resuming of dental services. Although the cost of this citywide COVID-19 testing in Wuhan was up to almost 128.78 million US dollars (Health Commission of Hubei Province, 2020), it was essential to raise awareness regarding the COVID-19 epidemic, to routinize screening and to identify previously unrecognized infections for citizens (Castel et al., 2012), and seemed to help dental services resuming in weeks after the COVID-19 pandemic in our study, including dental healthcare services of non-urgent reasons, such as orthodontics and implantation.

In conclusion, patient attendances for dental services have significantly increased after citywide COVID-19 testing in Wuhan, and this phenomenon was possibly due to citywide COVID-19 testing that decreased patients' reluctance to go to seek for dental care. People's demands for dental healthcare services of non-urgent reasons, such as orthodontics and implantation, seemed resuming quickly after citywide COVID-19 testing.

AUTHOR CONTRIBUTIONS

Jingjing Yu: Data curation; Formal analysis; Funding acquisition; Investigation. **Fan Hua:** Conceptualization; Supervision; Writing-review & editing. **Danchen Qin:** Data curation; Formal analysis. **Dan Zhao:** Conceptualization; Investigation; Supervision; Validation; Visualization; Writing-original draft. **Zhiyong Li:** Data curation; Supervision; Writing-review & editing.

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REFERENCES

- Castel, A.D., Magnus, M., Peterson, J., Anand, K., Wu, C., Martin, M., ... Greenberg, A.E. (2012). Implementing a novel citywide rapid HIV testing campaign in Washington, D.C.: Findings and lessons learned. *Public Health Reports*, 127(4), 422–431. <https://doi.org/10.1177/003335491212700410>
- Chen, N., Zhou, M., Dong, X., Qu, J., Gong, F., Han, Y., ... Zhang, L.I. (2020). Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: A descriptive study. *Lancet*, 395(10223), 507–513. [https://doi.org/10.1016/S0140-6736\(20\)30211-7](https://doi.org/10.1016/S0140-6736(20)30211-7)
- Cotrin, P., Peloso, R.M., Oliveira, R.C., de Oliveira, R.C.G., Pini, N.I.P., Valarelli, F.P., & Freitas, K.M.S. (2020). Impact of coronavirus pandemic in appointments and anxiety/concerns of patients regarding orthodontic treatment. *Orthodontics & Craniofacial Research*, In Press. <https://doi.org/10.1111/ocr.12395>. [Epub ahead print].
- Guo, H., Zhou, Y., Liu, X., & Tan, J. (2020). The impact of the COVID-19 epidemic on the utilization of emergency dental services. *Journal of Dental Sciences*. In Press. <https://doi.org/10.1016/j.jds.2020.02.002>. [Epub ahead of print].
- Health Commission of Hubei Province. (2020). *Press conference 104 "COVID-19 epidemic prevention and control"*. Retrieved from http://wjw.hubei.gov.cn/bmdt/ztlz/fkxxgzbdgrfyyq/xxfb/202006/t20200603_2376649.shtml
- Liu, J., Zhou, J., Yao, J., Zhang, X., Li, L., Xu, X., ... Zhang, K. (2020). Impact of meteorological factors on the COVID-19 transmission: A multi-city study in China. *Science of the Total Environment*, 726, e138513. <https://doi.org/10.1016/j.scitotenv.2020.138513>
- Meng, L., Hua, F., & Bian, Z. (2020). Coronavirus disease 2019 (COVID-19): Emerging and future challenges for dental and oral medicine. *Journal of Dental Research*, 99(5), 481–487. <https://doi.org/10.1177/0022034520914246>
- Wang, D., Hu, B.O., Hu, C., Zhu, F., Liu, X., Zhang, J., ... Peng, Z. (2020). Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*, 323(11), 1061–1069. <https://doi.org/10.1001/jama.2020.1585>
- World Health Organization. (2020). *Coronavirus disease (COVID-19) outbreak situation*. Retrieved from <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>
- Wu, D., Wu, T., Liu, Q., & Yang, Z. (2020). The SARS-CoV-2 outbreak: What we know. *International Journal of Infectious Diseases*, 94, 44–48. <https://doi.org/10.1016/j.ijid.2020.03.004>
- Yang, Y., Zhou, Y., Liu, X., & Tan, J. (2020). Health services provision of 48 public tertiary dental hospitals during the COVID-19 epidemic in China. *Clinical Oral Investigations*, 24(5), 1861–1864. <https://doi.org/10.1007/s00784-020-03267-8>