

Changes in respiratory diseases in Chongqing Health Center for women and children during COVID-19

M.-D. Xu¹, X.-X. Xu² and X.-M. Li²

1) The Third Affiliated Hospital of Chongqing Medical University, Chongqing, China and 2) Chongqing Health Center for Women and Children, Chongqing, China

Abstract

By comparing the outpatient volume of paediatric patients and the outpatient volume of respiratory tract infections in Chongqing Health Center for Women and Children in China from 2017 to June 2020, the changes in the outpatient volume of paediatric patients and the outpatient volume of respiratory tract infections during coronavirus disease 2019 (COVID-19) were summarized and analysed to provide a basis for disease prevention.

© 2021 The Authors. Published by Elsevier Ltd.

Keywords: Children, COVID-19, health, outpatient, prevention, respiratory infections

Original Submission: 25 October 2020; **Revised Submission:** 23 February 2021; **Accepted:** 24 February 2021

Article published online: 27 February 2021

Corresponding author: M.-D. Xu, The Third Affiliated Hospital of Chongqing Medical University, Chongqing, China.
E-mail: 304669329@qq.com

Introduction

Since coronavirus disease 2019 (COVID-19) was reported in Wuhan, China, in December 2019, it has attracted worldwide attention. To date, only a few countries, such as North Korea, have reported no cases of COVID-19. Globally, as of 9 December 2020, there have been 67 780 361 confirmed cases of COVID-19, including 1 551 214 deaths, reported to the World Health Organization. COVID-19 continues to spread, and the pandemic has resulted in difficulties in the economy and in daily life.

On 21 January 2020, the first case of COVID-19 in Chongqing was discovered [1]. To control COVID-19, Chongqing has taken a series of protective measures against COVID-19 in accordance with state instructions [2–5], such as hand hygiene, mask wearing, temperature measurement and isolation. During the period COVID-19 control, the outpatient volume and the disease spectrum of paediatric patients in Chongqing Health Center for Women and Children changed significantly, with the change in respiratory tract infectious diseases being the most obvious. We

also looked for the reasons for these changes. Therefore, we analysed the changes in paediatric respiratory tract infectious diseases in Chongqing Health Center for Women and Children.

Materials and methods

Data from all patients in the outpatient department of paediatrics of Chongqing Health Center for Women and Children from January 2017 to June 2020 were analysed. We performed statistical analysis of the changes in the number of paediatric outpatient volume and respiratory tract infectious diseases (International Classification of Diseases, Tenth Revision, J00–J31 and J36–J42) during the study period. This retrospective study was approved by the ethics committee of the Third Affiliated Hospital of Chongqing Medical University.

Excel 2013 (Microsoft, Redmond, WA, USA) and SPSS 17.0 (IBM, Armonk, NY, USA) software were used to collect, organize and describe the data. The Wilcoxon test was used for each month's data. Statistical significance was set at 5% ($p < 0.05$).

Results

The paediatric outpatient volume was 165 496 in 2017, 188 327 in 2018 and 209 058 in 2019. From 2017 to 2019, the paediatric

outpatient volume showed an increasing trend from year to year (Fig. 1, Tables 1 and 2), with the lowest number of visits and respiratory infections being in August of each year, the month of the Spring Festival (January or February) having the second lowest number of visits and the greatest number of visits being in November and December. From February to June 2020, the number of outpatients and respiratory disease visits showed a gradual increase.

The total number of outpatient visits and total respiratory disease visits from January to June in 2017, 2018 and 2019 showed a gradual increase (Fig. 2). Outpatient volume and total respiratory disease visits from January to June 2020 significantly decreased and were lower than in 2017 (Tables 3 and 4). Total outpatient volume and outpatient volume for respiratory diseases from January to June 2020 were compared to the same period in 2017, 2018 and 2019; the *H* test showed $p < 0.05$.

Discussion

Since COVID-19 was reported in Wuhan in December 2019, only a few countries and regions in the world, such as North Korea, have not reported COVID-19. The rapid spread of the disease and the extent of its spread were not expected. Globally, as of 9 December 2020, there were 67 780 361 confirmed cases of COVID-19, including 1 551 214 deaths, reported to the World Health Organization. To control the spread of the epidemic, China has adopted various forms of control, such as wearing masks, measuring body temperature, isolating patients and practicing hand hygiene [2–5]. From Fig. 1 we know that the number of outpatients and the number of

TABLE 1. Number of outpatients from January 2017 to June 2020

Month	2017	2018	2019	2020
1	12 376	14 948	19 950	15 335
2	11 100	11 817	13 794	5552
3	13 381	14 844	16 609	7979
4	13 736	15 462	17 771	8644
5	14 105	17 255	17 970	8774
6	13 997	16 326	17 303	10 344
7	13 537	15 212	16 618	
8	12 803	12 981	14 309	
9	14 789	13 810	15 864	
10	15 171	16 990	17 843	
11	15 239	19 270	19 589	
12	15 262	19 412	21 438	

patients with respiratory diseases in 2020 were significantly reduced since the government in January 2020 mandated wearing masks and adhering to hand hygiene measures [2–5] compared to the same months in previous years ($p < 0.05$).

Seto *et al.* [6] conducted a case–control study on severe acute respiratory syndrome (SARS) patients in five Hong Kong hospitals. The study indicated that wearing masks was one of the most effective ways to prevent SARS. Tang and Wong [7] conducted a survey of 1329 adults in Hong Kong and found that wearing masks was a good way to prevent SARS; the authors suggested that masks be worn in public. Bin-Reza *et al.* [8] believed that wearing a mask and using hand sanitizer reduced the secondary transmission of upper respiratory tract infections, flu-like diseases and lab-confirmed influenza; hand sanitizer alone did not decrease the transmission of these diseases. Hirose *et al.* [9] thought proper hand hygiene was important to prevent the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infections.

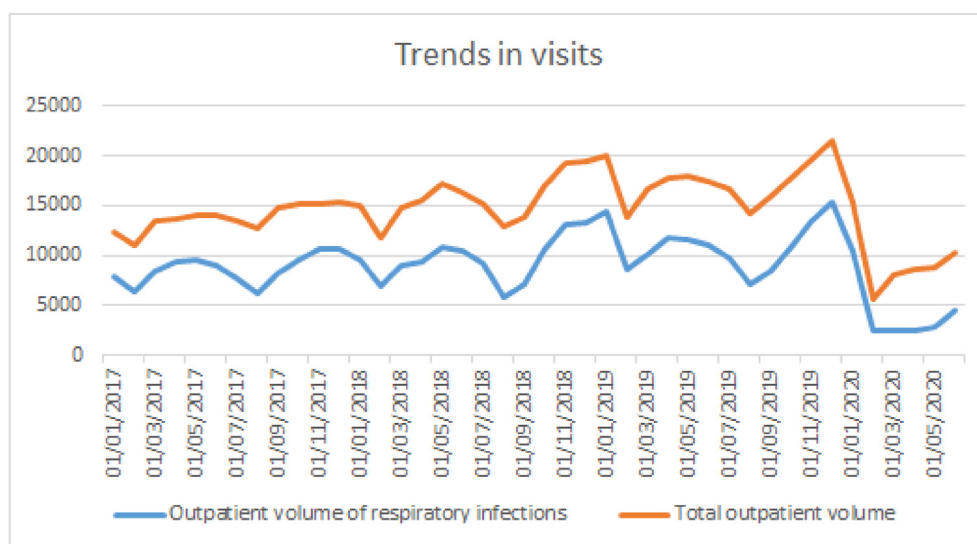


FIG. 1. Trend chart of changes in number of paediatric outpatients and respiratory disease outpatients from 2017 to June 2020.

TABLE 2. Number of outpatients receiving care for respiratory diseases from January 2017 to June 2020

Month	2017	2018	2019	2020
1	7789	9462	14 348	10 476
2	6309	6916	8532	2535
3	8359	8910	10 077	2505
4	9430	9419	11 751	2395
5	9559	10 888	11 646	2786
6	9005	10 506	11 078	4526
7	7618	9148	9701	
8	6229	5889	7147	
9	8158	7057	8485	
10	9560	10 607	10 787	
11	10 682	13 101	13 414	
12	10 703	13 352	15 361	

In the past, few people in China wore masks, but from the end of January to May 2020, everyone was required to wear a mask when entering public places. Now, although masks are no longer required, most people still wear them. Some people do not wear a mask when it is hot or when people are far apart, but wear them otherwise. From February to June 2020, the numbers of paediatric outpatients and respiratory outpatients at Chongqing Health Center for Women and Children were significantly reduced compared to the same period in 2017, 2018 and 2019. Respiratory diseases increased in May and June 2020 compared to February to April 2020, which may be related to the opening of Chongqing elementary schools in May and the opening of kindergartens in June, which increased the concentration of children. However, compared to May and June of 2017, 2018 and 2019, there was still a significant decrease in

TABLE 3. Statistical test results of outpatient volume from January 2017 to June 2020

Test	Result
Chi-square test	21.564
Degree of freedom	3
Asymp.sig	0.000

TABLE 4. Statistical test results of outpatients receiving care for respiratory diseases from January 2017 to June 2020

Test	Result
Chi-square test	14.982
Degree of freedom	3
Asymp.sig	0.002

May and June 2020; therefore, it is clear that wearing a mask has a significant preventive effect on respiratory diseases.

A meta-meta-analysis by Chaabna *et al.* [10] recommended medical face mask use by both healthy and ill individuals for preventing respiratory infection transmission in community settings. Koul *et al.* [11] indicated that travel increases the incidence of respiratory virus infection; preventive measures include vaccination/hand hygiene, cough etiquette and wearing masks. One previous study showed that crowded gatherings can significantly increase the rate of infection with respiratory diseases [12]. Chongqing opened its primary schools in May 2020 and its

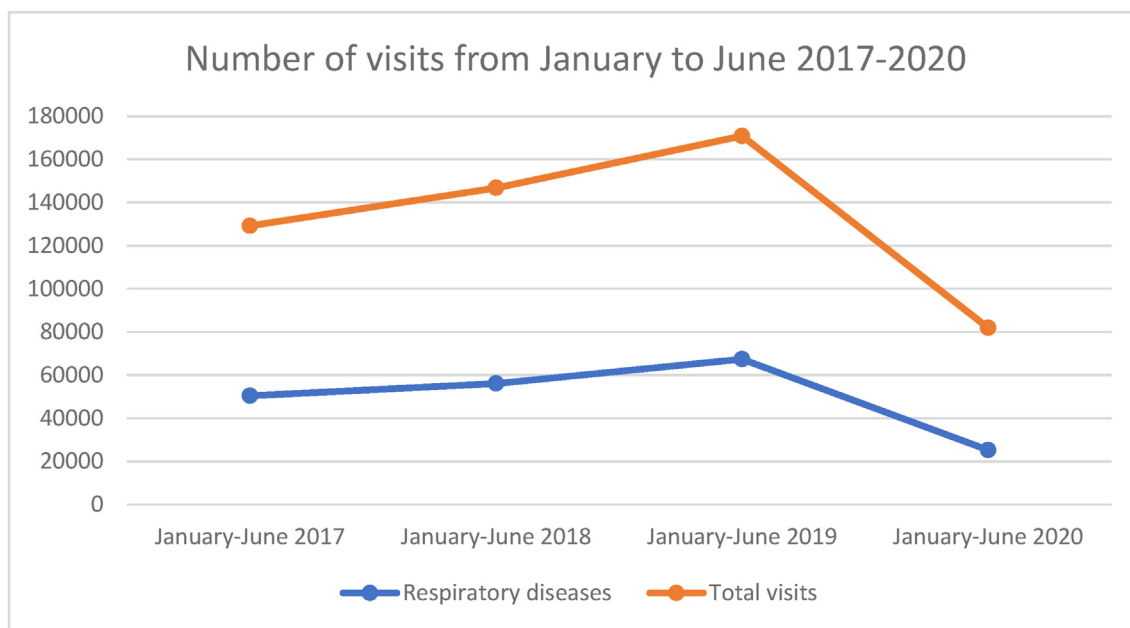


FIG. 2. Trend chart of paediatric outpatient volume and respiratory outpatient volume from January 2017 to June 2020.

kindergartens in June 2020. As a result, respiratory diseases gradually increased from February to June, indicating that clusters of infection can increase respiratory infections. Of course, another reason for the significant increase in June compared to May may be related to the decrease in wearing masks.

From February to May, in addition to mask wearing and isolation, hand hygiene and temperature monitoring were also important measures for preventing COVID-19. As an old Chinese saying goes, 'The disease enters by the mouth'. Jefferson *et al.* [13] showed in his seven case-control studies that barriers to transmission, isolation and hand hygiene were effective in controlling the prevalence of respiratory viruses. Mbakaya *et al.* [14] showed that hand hygiene can significantly reduce diarrhoea and respiratory infections. These results are similar to our observation that hand hygiene reduces respiratory infections in children.

In addition, body temperature must be strictly monitored when entering residential areas and schools. When the body temperature is higher than 37.3°C, people were not allowed to go to school or enter residential areas [15]. Parents could detect respiratory infections early and administer medication themselves to reduce the number of children going to hospital for treatment.

A limitation of our study is that the research time of this study on COVID-19 was relatively short; further data collection is needed.

Conflict of interest

None declared.

Acknowledgements

We thank our colleagues for their help.

References

- [1] Pan PF, Huang X, Hu P, Li WF, Xiang JL, Huang YH, *et al.* Report on the treatment of the first case of coronavirus disease 2019 in Chongqing. *Chongqing Med* 2020;15:2469–71. <https://doi.org/10.3969/j.issn.1671-8348.2020.15.013> (In Chinese).
- [2] Chinese Bureau of Disease Control and Prevention. Notice on issuing technical guidelines for disinfection operation of public transport. Available at: 29 January 2020 (In Chinese), <http://www.nhc.gov.cn/jkj/s3577/202001/2152d180f15540039ccd3c79d660c230.shtml>.
- [3] Chinese Bureau of Disease Control and Prevention. Notice of the General Office of the National Health Commission on issuing the new coronavirus pneumonia prevention and control plan. Available at: 3rd ed. 28 January 2020 (In Chinese) <http://www.nhc.gov.cn/jkj/s7923/202001/470b128513fe46f086d79667db9f76a5.shtml>.
- [4] Available at: Chinese Bureau of Disease Control and Prevention. Notice on strengthening community prevention and control of pneumonia epidemic caused by new coronavirus infection. 25 January 2020 (In Chinese), <http://www.nhc.gov.cn/jkj/s3577/202001/dd1e502534004a8d88b6a10f329a3369.shtml>.
- [5] Available at: Chinese Bureau of Disease Control and Prevention. Notice on issuing technical guidelines for the selection and use of masks for the prevention of new coronavirus infection by different groups. 5 February 2020 (In Chinese), <http://www.nhc.gov.cn/jkj/s7916/202002/485e5bd019924087a5614c4f1db135a2.shtml>.
- [6] Seto WH, Tsang D, Yung RW, Ching TY, Ng TK, Ho M, *et al.* Effectiveness of precautions against droplets and contact in prevention of nosocomial transmission of severe acute respiratory syndrome (SARS). *Lancet* 2003;361(9368):1519–20.
- [7] Tang CS, Wong CY. Factors influencing the wearing of facemasks to prevent the severe acute respiratory syndrome among adult Chinese in Hong Kong. *Prev Med* 2004;39:1187–93.
- [8] Bin-Reza F, Lopez Chavarrias V, Nicoll A, Chamberland ME. The use of masks and respirators to prevent transmission of influenza: a systematic review of the scientific evidence. *Influenza Other Respir Virus*. 2012;6:257–67.
- [9] Hirose R, Ikegaya H, Naito Y, Watanabe N, Yoshida T, Bandou R. Survival of SARS-CoV-2 and influenza virus on the human skin: importance of hand hygiene in COVID-19. *Clin Infect Dis* 2020. <https://doi.org/10.1093/cid/ciaa1517>.
- [10] Chaabna K, Doraiswamy S, Mamtani R, Cheema S. Facemask use in community settings to prevent respiratory infection transmission: a rapid review and meta-analysis. *Int J Infect Dis* 2020;104:198–206. <https://doi.org/10.1016/j.ijid.2020.09.1434>.
- [11] Koul PA, Mir H, Saha S, Chadha MS, Potdar V, Widdowson MA, *et al.* Respiratory viruses in returning Hajj and Umrah pilgrims with acute respiratory illness in 2014–2015. *Indian J Med Res* 2018;148:329–33. https://doi.org/10.4103/ijmr.IJMR_890_17.
- [12] Figueroa A, Gulati RK, Rainey JJ. Estimating the frequency and characteristics of respiratory disease outbreaks at mass gatherings in the United States: findings from a state and local health department assessment. *PLoS One* 2017;12:e0186730.
- [13] Jefferson T, Del Mar C, Dooley L, Ferroni E, Al-Ansary LA, Bawazeer GA, *et al.* Physical interventions to interrupt or reduce the spread of respiratory viruses: systematic review. *BMJ* 2009;339:b3675. <https://doi.org/10.1136/bmj.b3675>.
- [14] Mbakaya BC, Lee PH, Lee RL. Hand hygiene intervention strategies to reduce diarrhoea and respiratory infections among schoolchildren in developing countries: a systematic review. *Int J Environ Res Public Health* 2017;14:371. <https://doi.org/10.3390/ijerph14040371>.
- [15] Chinese Bureau of Disease Control and Prevention. Notice on the issuance of technical plans for the prevention and control of the new crown pneumonia epidemic in primary and secondary schools and kindergartens. Available at: 8 May 2020 (In Chinese), <http://www.nhc.gov.cn/jkj/s5898bm/202005/717fd91eb85441dca4e49bc8200b45b8.shtml>.