The first wave of SARS-CoV-2 infection among hospitalized children after the adjustment of prevention measures in Henan, China

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Abstract

On December 7 th of 2022, the province and the country experienced a huge adjustment of the prevention and control measures against SARS-CoV-2, which was called the ten actions. But we still performed regular SARS-CoV-2 nucleic acid testing for hospitalized patients before their admission, which could to some extent reflect the infection rates of the total society. A total of 2212 cases and 439 positive cases were enrolled in the study. The infection rate increases from the first to the third week, and then decreases from the third to the eighth period. The infection rate of the eighth week returned nearly to the rate of the first week. The adjustment on the prevention and control measures resulted in rapid increase of SARS-CoV-2 infection rate among hospitalized children through the first three weeks, and it took nearly eight weeks for the infection to recover to the rate at the beginning of the adjustment. Continuous monitoring of the infection is required in the future to help reduce the infection.

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Conflicts of Interests

None to declare.

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Dear Editor

In our previous study, we demonstrated a decreased trend of influenza infections in children[1],and the infection rate of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) remained very low during the past

three years in China. But from December 7th of 2022, the province and the country experienced a huge adjustment of the prevention and control measures against SARS-CoV-2, and we report the infection rate of SARS-CoV-2 among hospitalized children in this study.

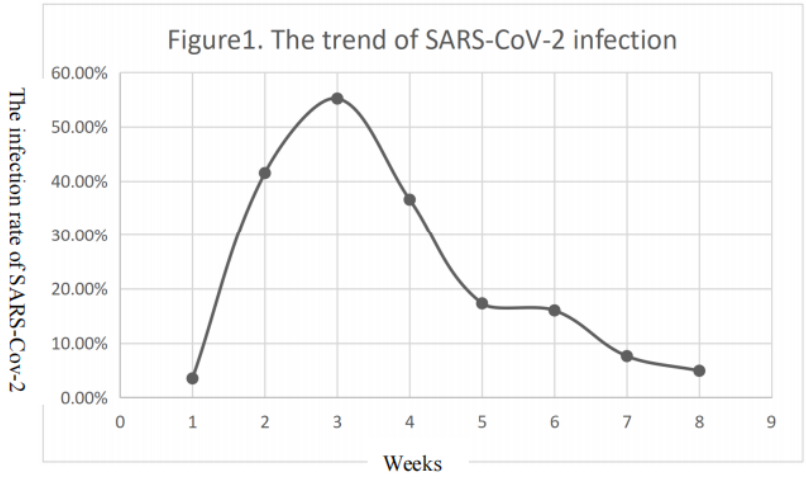
Since its occurrence, SARS-CoV-2 mutated from the original strain to Delta and to the present Omicron strain, and the virulence of SARS-CoV-2 decreased markedly. But the transmission ability of SARS-CoV-2 has been strengthened a lot, so the difficulty in the prevention and control of infection increased significantly. On December 7th, 2022, the country published the ten new actions, which marked huge changes of measures toward SARS-CoV-2. Form the ten new actions, the defined high risk area is narrowed when infected cases appear, the society reduces nucleic acid testing sphere of SARS-CoV-2, the check of negative nucleic acid testing results is canceled in the majority of public places, and the infected cases are not required to be isolated intensively.

Although the ten actions had been implemented, we still performed regular SARS-CoV-2 nucleic acid testing for hospitalized patients before their admission, which could to some extent reflect the infection rates of the total society. We conducted our study from December 7th, 2022 to January 31st, 2023, which included eight weeks. The study population included were hospitalized children at Children's Hospital Affiliated to Zhengzhou University, which is a general and the largest hospital for children with nearly two million outpatient visits and one hundred thousand inpatients each year in central Henan, China. All the hospitalized children would be tested of the SARS-CoV-2 infection by nucleic acid testing before admitted into the hospital. The oropharyngeal or nasopharyngeal swabs were used to collect specimens from the hospitalized children, and then kept in virus preserving fluid before transported to the laboratory for SARS-CoV-2 nucleic acid testing. The testing was conducted by real-time PCR method targeting the *N* and *ORF1ab* genes of SARS-CoV-2 with the Mingde detection kit (Wuhan, China) according to the manufacturer's instructions. Positive results were defined as the Ct values [?]35 for both genes.

We recorded the results of each week, and the ranges of dates included in each week were: first (December 7th to 13th, 2022), second (December 14thto 20th, 2022), third (December 21stto 27th, 2022), fourth (December 28th, 2022 to January 3rd,2023), fifth (January 4th to 10th, 2023), sixth (January 11th to 17th), seventh (January 18th to 24th,2023), eighth (January 25th to 31st, 2023). A total of 2212 cases and 439 positive cases were enrolled in the study. The numbers of total cases, SARS-CoV-2 positive cases and the positive rates of each week are shown in Table 1. The trend of SARS-CoV-2 positive rates from the first to the eighth week is demonstrated in Figure 1. From Figure 1, it can be concluded that the infection rate increases from the first to the third week, and then decreases from the third to the eighth period. The infection rate of the eighth week returned nearly to the rate of the first week. So the huge adjustment on prevention and control measures against SARS-CoV-2 affected the spread of infection significantly for the rapid increase of infection through the first three weeks. The decreased trend of infection rate in the fourth to the eighth week might be due to the fact that more and more children had been infected and recovered from the infection.

Table 1 The numbers of total cases, SARS-CoV-2 positive cases and the positive rates of each week

Weeks	Number of total cases	Number of positive cases	Positive rate(%)
First	318	11	3.5
Second	217	90	41.5
Third	125	69	55.2
Fourth	309	113	36.6
Fifth	423	73	17.3
Sixth	319	51	16.0
Seventh	277	21	7.6
Eighth	224	11	4.9
Total	2212	439	19.8



Although the treatment options have increased, and the virulence of Omicron variant decreased significantly, the infection still causes deaths among the most vulnerable population[2]. An undiagnosed heart condition associated with adrenergic stimulus caused by high-intensity exercises can lead to sudden cardiac death[3]. So it's still important to protect ourselves to avoid infection or reduce the infection times under the new prevention and control measures.

In conclusion, the adjustment on the prevention and control measures resulted in rapid increase of SARS-CoV-2 infection rate among hospitalized children through the first three weeks, and it took nearly eight weeks for the infection to recover to the rate at the beginning of the adjustment. Continuous monitoring of the infection is required in the future to help reduce the infection.

AUTHOR CONTRIBUTIONS

Maodong Leng: Designed the study and wrote the manuscript. Junmei Yang: Performed and managed the PCR-specific testing. All read and approved the final manuscript.

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EHTICS STATEMENT

All testing was performed as part of routine clinical care, and ethics statement is not applicable to this article.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study. All relevant data are presented in the article.

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