Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Commentary

Fangcang shelter hospitals in COVID-19 pandemic: the practice and its significance

L. Shang [1, 2, 3], J. Xu [4], B. Cao [2, 3, 5, 6, *]

[1)] *Beijing University of Chinese Medicine, Beijing, China*
[2)] *Department of Pulmonary and Critical Care Medicine, Center of Respiratory Medicine, National Clinical Research Center for Respiratory Diseases, China–Japan Friendship Hospital, Beijing, China*
[3)] *Institute of Respiratory Medicine, Chinese Academy of Medical Sciences, Beijing, China*
[4)] *Tsinghua University School of Medicine, Beijing, China*
[5)] *Tsinghua University-Peking University Joint Center for Life Sciences, Beijing, China*
[6)] *Department of Respiratory Medicine, Capital Medical University, Beijing, China*

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Coronavirus disease 2019 (COVID-19), an emerging respiratory infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been spreading across the world rapidly and claiming tens of thousands of lives. On 11 March 2020, the WHO announced it to be a global pandemic. As of 6 April 2020, more than a million COVID-19 cases have been confirmed globally with over 60 000 deaths [1].

The rapidly increasing number of COVID-19 cases is posing a huge challenge to medical systems worldwide. In pandemic-affected areas, hospital beds are limited and overwhelmed by the large numbers of patients. Given the shortage of medical resources in some countries, only severely ill patients can be admitted to hospitals, leaving many more patients, often with mild-to-moderate symptoms, left unattended at home. Home isolation can lead to two problems. First, individuals with SARS-CoV-2 infection who stay at home contribute to the household and community transmission of SARS-CoV-2. It is inevitable that those staying at home will have close contact with their family members and easily transmit the virus. Also, it may be hard for some countries to strictly manage the large number of patients under home isolation because of the lack of extensive human resources, so the patients might move around and have contact with other people in the community. This could result in community transmission and further increase the number of COVID-19 cases [2]. Second, leaving patients at home might delay the optimised timing of supportive medical care. Individuals with COVID-19 can deteriorate quickly from mild/moderate to severe illness [3]. Individuals in home isolation often did not receive appropriate symptom monitoring and prompt referral to hospitals when necessary. Without appropriate medical care, individuals with rapid disease progression would further increase the burden of medical systems. The above-mentioned factors will consistently contribute to the shortage of medical resources and ultimately collapse the medical system, as is happening currently in many disease-stricken areas around the world.

During past infectious disease epidemics or natural disasters, mobile field hospitals have been put in place to cope with the shortage of medical resources [4,5]. However, the capacity of mobile field hospitals is comparatively small, especially in the face of the exponentially increasing number of COVID-19 cases. The Fangcang shelter hospital, also referred to as 'Fangcang hospital' for short, was built in Wuhan, China to curb the spread of COVID-19 and provide timely basic medical care to patients. Fangcang shelter hospitals were transformed from large public facilities such as sports stadia and exhibition centres in a very short time, providing a large number of beds to admit and treat individuals with mild-to-moderate COVID-19. As discussed at length in a recent health-policy article, the major functions of Fangcang shelter hospitals

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* **Corresponding author**: B. Cao, Department of Pulmonary and Critical Care Medicine, China-Japan Friendship Hospital, No 2, East Yinghua Road, Chaoyang District, Beijing, 100029, China.
E-mail address: caobin_ben@163.com (B. Cao).

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are isolation, triage, basic medical care, frequent monitoring and rapid referral [6]. Apart from being a hospital, the Fangcang shelter hospital also provided food and shelter, as well as social engagement, for individuals with COVID-19 [6]. By obviating the risk of within-household and community transmission, Fangcang shelter hospitals were one of the key measures to control the epidemic in Wuhan, China [7], and could be a game changer for other countries as well [8].

In this issue of *Clinical Microbiology and Infection*, Wang et al. described the work flow of Fangcang shelter hospitals and reported the clinical characteristics of COVID-19 patients in Dongxihu Fangcang shelter hospital, one of the largest Fangcang shelter hospitals in Wuhan [9]. Dongxihu Fangcang shelter hospital was transformed from an exhibition centre to a temporary hospital with more than 1000 beds and began to admit patients on 7 February 2020. The authors retrospectively analysed the clinical data of 1012 individuals admitted to the Dongxihu Fangcang shelter hospital from 7 to 12 February 2020. All patients had laboratory-confirmed COVID-19 with moderate symptoms (respiratory rate <30 breaths/minute and blood oxygen saturation >93% at resting state), and were tested negative for influenza virus before admission. They were also required to have self-care ability without serious underlying diseases or co-morbidities.

This paper was the first to report the clinical characteristics of individuals with mild-to-moderate COVID-19 in a Fangcang shelter hospital. The most common symptoms (fever and cough), underlying diseases (hypertension and diabetes) and radiological manifestations (patchy opacity and ground-glass opacity) in this cohort were similar to the observations in previous reports [10,11]. However, the authors reported a relatively high rate of diarrhoea (15%) in the Fangcang cohort [12]. It is still not clear whether this is a characteristic of mild disease or related to certain treatments before admission. As faecal samples of some patients were reported to be RT-PCR positive for SARS-CoV-2, there is the possibility for faecal–oral transmission [3,13]. Therefore, the gastrointestinal symptoms of the individuals with mild-to-moderate disease should be carefully monitored. Asymptomatic patients might also transmit the virus and make effective disease control more difficult [14]. This paper reported a low proportion (1.4%) of asymptomatic infection in the Fangcang cohort. However, the data should be interpreted carefully because they were derived from hospitalised patients and data from the general population are lacking. Large-scale sera-epidemiology studies in the general population and follow-up investigation of close contacts may help to confirm the proportion of asymptomatic individuals with SARS-CoV-2 infection. Besides, in the Fangcang cohort, the white blood cell counts were normal for most individuals, but the differential counts and many other laboratory findings were absent in many cases. As Fangcang shelter hospitals or their equivalents are being built worldwide, it is important to investigate the laboratory characteristics of individuals with mild-to-moderate COVID-19 to optimise patient management.

Of note, the authors identified some risk factors of disease progression by comparing the clinical characteristics of patients with exacerbation and those without. Previous studies have identified older age, higher D-dimer, and coexisting diseases, such as hypertension and diabetes, to be associated with higher risk of severe disease or death [15–17]. With dynamic observation of patients with mild-to-moderate disease, this paper provided clues to risk factors for disease progression, such as older age, diabetes and cardiovascular disease, some of which were similar to the risk factors for poor prognosis identified earlier. However, most of the patients in the study were still hospitalised at the final follow up and the results were not adjusted for potential confounding factors, so this might not be the final conclusion and should be interpreted prudently. Identifying risk factors for disease progression in individuals with mild-to-moderate disease is important for optimal triage and management of patients in Fangcang shelter hospitals or their equivalents around the world. Further studies with longer follow up and definite outcomes are needed to confirm the risk factors for disease progression.

As the number of confirmed cases is soaring in many countries around the world [1], Fangcang shelter hospitals, or facilities with similar functions, are urgently required. Although the names and admission criteria may differ among facilities, the core concept is to completely isolate mild-to-moderate COVID-19 patients in Fangcang shelter hospitals, not in homes, thus reducing household and community transmission.

Fangcang shelter hospitals are a novel approach for responding to the COVID-19 pandemic and have provided isolation, triage, timely and high-quality medical care, disease monitoring and referral, and social engagement for mild-to-moderate COVID-19 patients. Wang et al. expanded our knowledge on Fangcang shelter hospitals by presenting clinical features of the admitted patients [9]. These data could help to identify the disease characteristics of this mild-to-moderate sub-group and the risk factors for disease progression. Other countries can also refer to the experience in combatting COVID-19.

Author contributions

BC is the corresponding author and conceived the article. LS and JX wrote the original draft and BC, JX and LS were responsible for reviewing and editing the article.

Transparency declaration

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