Hospital response to the COVID-19 outbreak: the experience in Shanghai, China

Yuxia ZHANG, RN, PhD; Zhan SUN, MD; Jos M. LATOUR, RN, PhD; Bijie HU, MD, PhD; Juying QIAN, MD, PhD

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Yuxia ZHANG, RN, PhD

Department of Nursing, Zhongshan Hospital, Fudan University, Shanghai, China

Email: zhang.yuxia@zs-hospital.sh.cn

Zhan SUN, MD

Department of Medical Affairs, Zhongshan Hospital, Fudan University, Shanghai, China

Email: sun.zhan@zs-hospital.sh.cn

Jos M. LATOUR, RN, PhD

Faculty of Health: Medicine, Dentistry and Human Sciences, University of Plymouth, Plymouth, United Kingdom

Email: jos.latour@plymouth.ac.uk

Bijie HU, MD, PhD

Department of Infectious Diseases, Zhongshan Hospital, Fudan University, Shanghai, China

Email: hu.bijie@zs-hospital.sh.cn

Juying QIAN, MD, PhD

Department of Cardiology, Zhongshan Hospital, Fudan University, Shanghai, China

Email: juying_qian@163.com

Corresponding author:

Juying QIAN

Department of Cardiology, Zhongshan Hospital, Fudan University, Shanghai, 180 Fenglin Road, Shanghai, China, 200032

Tel: 86-21-64041990; Email: juying_qian@163.com

Conflict of Interest:

We declare no competing interest.

On 20th January 2020, the first COVID-19 case was reported in Shanghai, China. As of 12th March 2020, 344 cases with laboratory-confirmed COVID-19 infection have been detected in Shanghai, of which three died, 321 patients are discharged, 20 patients still receive ongoing treatments (Shanghai Municipal Health Commission, 2020). All confirmed patients with COVID-19 were centralised in Shanghai Public Health Medical Centre to receive standardised treatments. Shanghai is an international metropolis with more than 27 million residents, of which 9.7 million are commuting population. It has been a challenge for Shanghai to control the COVID-19 outbreak among the high density and high mobility population. On 21st January 2020, Shanghai Municipal Health Commission set up fever clinics in 110 hospitals as frontlines services to screen suspected patients. The hospitals went into a 'state of alert' and adopted strategies to cope with the COVID-19 outbreak (Wang, et al., 2020; Cohen and Normile, 2020).

Zhongshan Hospital of Fudan University is a general hospital listed as the top five academic centre in China and is one of the assigned sentinel hospitals with fever clinics. A hospital-wide COVID-19 committee was set up and initiated a *response framework* to prevent and safeguard patients, family and staff from COVID-19 infection. We briefly present our response framework, including procedures, human resources, patient management, and staff emotional support, to share our experiences in this global health emergency.

Procedures and policies were initiated based on the characteristics of COVID-19 targeting the sources of infection, routes of transmission, diagnosing, treating, and

reporting. Other procedures were related to wearing personal protective equipment, allocation of supplies and patient transfers (Chang et al., 2020). Allocation of supplies was strictly based on the stratification of infection risk. All procedures were dynamic, and changes were implemented based on the emerging new COVID-19 knowledge to ensure up-to-date requirements and reality of managing the hospital in a challenging climate (Sun, Chen & Viboud, 2020).

Human resource management involved a review of staff capacity and identified staff availability to allocate to a COVID-19 rapid response team. The criteria for nurses were minimal 3-year work experience in emergency, critical care, respiratory or infection departments. For doctors the criterium was being an attending physician or above. To ensure staff availability of the vital units, we assigned nurses and doctors to emergency departments and fever clinic. Furthermore, responding to the national-wide assignment, our hospital organized four teams comprised of 47 doctors, 110 nurses, and six administrators to support the hospitals in Wuhan and the Shanghai Public Health Medical Centre.

Patient management and flow was regulated to safeguard in- and out-of-hospital patients. To minimize intra-hospital infection among fever patients, two COVID-19 fever clinics, independently located, were successively set-up with 17 quarantine rooms for highly suspected patients. As of 27th February 2020, the fever clinics received 3,145 patients, monitored 44 suspected patients and three patients were confirmed with COVID-19 (Figure 1). Hospital entrances were controlled by staff and each patient/visitor had to follow safety procedures (Figure 2, Figure 3). These

included temperature check and a survey of clinical history (Table 1). Only patients with critical conditions were admitted after COVID-19 screening from 23rd January to 3rd February 2020. During the outbreak, we continued the haemodialysis and chemotherapy outpatient services under strict surveillances. With the daily confirmed cases decreasing in Shanghai, we gradually resumed outpatient services and elective surgery to satisfy the medical demand of patients while preventing the intra-hospital infection. Restricted visiting times were implemented (10:00-12:00hrs and 14:00-16:00hrs), and only one visitor per patient was allowed. Social media channels were initiated to communicate and provide online consultations with the public and chronically ill patients.

The unexpected outbreak with high transmission brings fear and anxiety to medical staff. Emotional support was initiated by psychosocial intervention teams COVID-19 Balint group (Abeni et al., 2014). These groups included psychiatrists and volunteers. Besides, a telephone hotline and WeChat account (smartphone application with similar features as WhatsApp/Facebook) were provided as well. Front-line medical and nursing staff (n=160) who are working in Wuhan and their family members were provided with similar psychological support.

The COVID-19 outbreak is challenging for all healthcare professionals on a collective and individual level. The unconditional professionalism of staff is heroic to combat the COVID-19 epidemic. By implementing the response framework, our hospital was able to maintain its operational business for all patients without any intra-hospital COVID-19 infections. By sharing our clinical experience, we hope that

other hospitals facing COVID-19 outbreaks in their countries can enhance their preparedness and performance to safeguard patients, families and staff.

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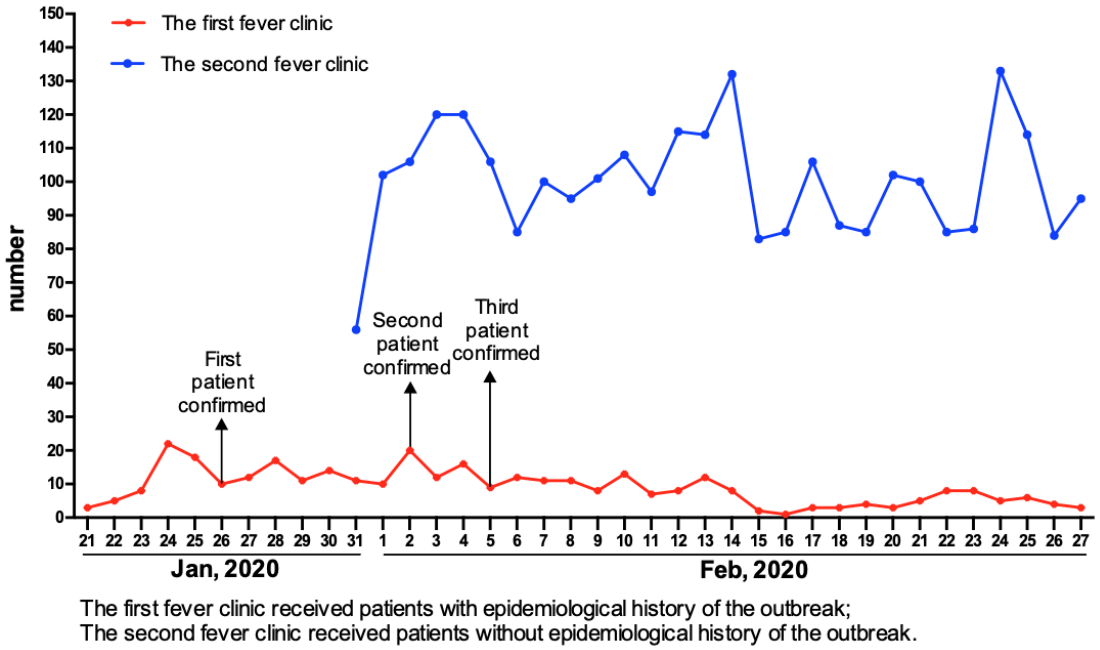

Figure 1. Patient flow of the fever clinics

Figure 2. Entrance of outpatient department: conducting temperature check and epidemiological survey

Figure 3. Four steps to complete entrance check in inpatient ward: temperature check; hands disinfection; epidemiological survey; visiting information record.

Table 1 Survey clinical and contact history

	Items	Answer of the patient		Answer of the visitor	
Clinical symptoms and signs	Did you have fever over the previous 14 days?	No	Yes	No	Yes
	Did you have symptoms related respiratory tract infection, such as cough, over the previous 14 days?	No	Yes	No	Yes
	Did you frequently feel fatigued over the previous 14 days?	No	Yes (diagnosed with: _____)	No	Yes (diagnosed with: _____)
	Did you frequently have diarrhoea over the previous 14 days?	No	Yes	No	Yes
Contact traces	Did you have travel history or residence history in Wuhan and surrounding areas or other communities with COVID-19 case reports over the previous 14 day?	No	Yes (Name of city: _____) （Arrival date at Shanghai:_____）	No	Yes (Name of city: _____) （Arrival date at Shanghai:_____）
	Did you have contact with patients with fever or respiratory tract symptoms from Wuhan and surrounding areas or other communities with COVID-19 case reports over the previous 14 days?	No	Number of people with fever you contacted: ____ Their relations with you: ____ District of the patents: ____ Date of patients' arrival to Shanghai: ____	No No No	Number of people with fever you contacted: ____ Their relations with you: ____ District of the patents: ____ Date of patients' arrival to Shanghai: ____
	Were you around the clustering occurrence of COVID-19 or epidemically associated with COVID-19 confirmed patients?	No	Number of people you contacted: ____ Date of your contact: ____ Date of patients' arrival to Shanghai: ____ Their relations with you: ____ District of the people you contacted: ____	No No No No	Number of people you contacted: ____ Date of your contact: ____ Date of patients' arrival to Shanghai: ____ Their relations with you: ____ District of the people you contacted: ____

Please filling the form and return it back to nurses. Thank you for your cooperation!

I acknowledge the above information is true. Signature (patient): Date:

Relationship with patient: Signature (family): Date: