RESEARCH ARTICLE

Testing the Foundations: A Glimpse into Health Service Delivery in China during the Ongoing COVID-19 Pandemic

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ABSTRACT

Pandemics can severely impact the capability of a healthcare system, especially the availability of health service delivery. This paper analyzes China's response to the COVID-19 pandemic by assessing its provision of health service delivery. The objectives of this review are to identify themes in health service delivery models from the Chinese response and suggest recommendations for strengthening future Chinese pandemic responses. Major themes were identified in the types of healthcare service delivery models that guided the Chinese COVID-19 response. These models include the increasing use of telemedicine, 'internet hospitals', and the use of Fangcang hospitals during the peak of the pandemic. Exploration of these themes has led to recommendations of creating a national registry to monitor healthcare services while leveraging telemedicine platforms to continue access to routine medical services for the public.

INTRODUCTION

Between December 2019 and January 29, 2021, China has reported 100,641 cases of COVID-19 and 4,820 deaths [1,2]. During the pandemic's early days, China faced challenges related to insufficient medical supplies, logistics, and health services [3]. This paper presents how China's health service delivery adaptations to these challenges impacted their COVID-19 morbidity and mortality trends and suggests recommendations to improve future pandemic health service delivery responses.

METHODOLOGY

A primary component of health care systems is health service delivery [4]. This paper defines health service delivery as all components providing healthcare within a geographical region [5]. A literature review was conducted using MEDLINE (Ovid) and PubMed databases. Appendix A provides further details on the selection strategy used [6]. Articles were limited to those written in English and published between 2019 and 2021. Gray and scholarly literature were eligible for this review. The search strategy applied to each database consisted of relevant subject headings and keywords, including "health service delivery," "COVID-19", and "China" (see Appendix B). Additionally, COVID-19 transmission and mortality data was obtained from the Oxford University database Our World in Data (OWID), which has been cited in scientific journals such as Nature and The Royal Society [7,8], and the WHO COVID-19 dashboard. Transmission and mortality trends were examined beginning on January 22, 2020, as this was the first data available

in OWID datasets for COVID-19 in China [1,9] to December 18, 2020 (present-day of writing).

DISCUSSION

In China, between late January and early March of 2020, there was an exponential growth of positive cases of COVID-19, followed by significant increases in deaths caused by the disease. Despite the rapid growth in COVID-19 morbidity and mortality, China's measures rapidly decreased new incidences and outbreaks of COVID-19 by late March. This was demonstrated by a nearly tenfold decrease in disease incidence between its peak on February 14, 2020 and March 1, 2020 according to the database Our World in Data [9]).

The COVID-19 pandemic negatively affected health services availability and utilization in China. For example, fear of contracting COVID-19 disease and stringent quarantine policies resulted in decreased national and regional health services usage by 37.8% and 40.8%, respectively [10]. Several approaches were utilized to improve access to Chinese healthcare service delivery during the COVID-19 pandemic. One main theme identified was the use of telemedicine, defined by the WHO as "healing at a distance" [11]. For example, following the peak of COVID-19 cases, several Chinese hospitals offered internet-based healthcare services. Additionally, telemedicine was extensively used to provide mental health services during the pandemic [11]. One study evaluated the ability of a video-conferencing platform to carry out consultation interventions targeting older adults with neurocognitive disorders [12]. Another study concluded that using an amalgamation of virtual care such as video conferences with telemedicine or telemedicine alone improved the health and well-being of mental health patients and their caregivers [13].

Another theme identified was the implementation of China's 'internet hospitals', an outpatient care approach using internet technologies to provide health services that was pivotal in alleviating overburdened health systems during stringent quarantine policies [14]. A total of 146 of these 'internet hospitals' were constructed between January and April 2020 [15]. An example of a service provided through these facilities was online medical service delivery for high-risk cancer patients, which was used to ensure individuals received high-quality care while simultaneously reducing their risk of COVID-19 infection. Hospitals integrated online medical counselling, medication delivery programmes, and web chats for critical care patients to communicate with oncologists [16]. Approximately 32,676 patients participated in non-COVID-related virtual consultations via these facilities from February to April 2020 [17]. The nationwide application of internet hospitals and telemedicine were thus key drivers in sustaining China's resilience against the COVID-19 pandemic.

Additionally, in applying lessons learned from the successful response to the 2003 SARS outbreak, the Chinese government responded by constructing 16 Fangcang shelter hospitals over three weeks to increase access to healthcare services [18]. By converting large venues to makeshift hospitals, 13,000 additional beds were provided [19]. These reduced the number of patients with infectious COVID-19 that needed to be isolated at home, lowering the risk of household and community transmission [20,21]. While with the initial lack of hospital beds there was an increase in transmission between family members, modelling has suggested that a one-day delay in opening Fangcang hospitals (February 6th instead of 5th) would have dramatically increased COVID-19 morbidity and mortality, resulting in 7,413,798 cases (compared to 50,844 positively-identified cases) and 1,396,017 deaths (compared to 5,003 confirmed deaths) [11,22]. The efficiency with which temporary health facilities and inpatient beds were established thus contributed to the prevention of more COVID-19 cases and fatalities.

RECOMMENDATIONS

Although China's pandemic response was widely commended for its speed and effectiveness [20], the following recommendations have the potential to improve the preparedness of the Chinese healthcare system for similar situations in the future:

Harmonize and increase accessibility to medical resources across the nation: A national registry can be used to monitor allocation of equipment, personnel, and resources to regions that do not have access to ICUs and adequate medical staff and resources [23]. The harmonization of medical resources will facilitate rapid deployment of said resources, crisis response teams, and future Fangcang hospitals to underserved regions. For example, a similar strategy called Hospital Real-Time Location Systems (HRTLS), implemented in Iran, has been used to track medical personnel and equipment for ready deployment during public emergencies [24].

Moreover, an increased number of temporary healthcare facilities and beds would align with recommended indicators made by the WHO to improve health service delivery within geographical regions [25]. It is evident that improvements in these health service delivery indicators were associated with lower COVID-19 mortality [22].

Develop and maintain telemedicine services for routine healthcare and create surge capacity to maintain preventative and curative health service delivery: The establishment of a permanent telemedicine system could benefit China in future pandemics as well as non-crises. Some studies identified a decline in the use of routine healthcare services in China during the peak of the COVID-19 pandemic due to heightened fear of being at risk for hospital-acquired COVID-19 infection [10]. Telemedicine has the potential to increase the use of essential health services such as mental health care. The rapid deployment of telemedicine during the early months of the pandemic was crucial for maintaining teleconsultations, mental health interventions, and delivery of physical services such as prescriptions. Given the success of telemedicine initiatives not only in maintaining treatment during the pandemic but in improving health service delivery overall, it is therefore pertinent that this practice is sustained and further developed [26]. Worth considering is that, although the permanent establishment of telemedicine may introduce novel

health care delivery models that are resilient to 'pandemic shocks,' economic feasibility will also have to be considered. Contingency preparedness plans should be tailored for the outpatient delivery of treatments, such as TB medication and chemotherapy, and these outpatient delivery systems should be maintained so routine care is not interrupted [27].

CONCLUSION

The outbreak response by China demonstrated success in decreasing COVID-19 mortality and morbidity rates by expanding health service delivery through the provision of additional inpatient hospital beds, telemedicine, and 'internet hospitals'. By integrating the proposed recommendations, China can enhance their readiness for future pandemics.

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