



Investigation on Disease Prevention, Control System Under Public Health Emergencies

Nan Wang¹ and Tong Kang²(✉)

¹ Chenggong Hospital of Kunming Yan'an Hospital, Yunnan, China

² School of Cancer and Pharmaceutical Sciences, Faculty of Life Sciences & Medicine, King's College London, London, UK
asderty67rtyasd@gmail.com

Abstract. The COVID-19 outbreak in 2020 has highlighted the need to investigate the current disease control system to ensure the health and safety of the Chinese people. The practice of epidemic prevention and control has shown the advantages of organization, command and emergency mobilization, as well as the superior ability to cope with complex situations and major risks and challenges, but it has also exposed problems in the surveillance and early warning system for emerging infectious diseases. Therefore, this paper will conduct a comprehensive literature review and systematic discussion to improve the ability of rapid response to disease and the decision-making ability of major epidemics.

Keywords: Public health emergencies · COVID-19 · Control system · Decision-making strategy

1 Introduction

Member compliance mechanism of global public health governance refers to the establishment of “guidance mechanism” of compliance in global public health governance through positive incentive for compliance and negative punishment for breach of contract. Its aim is to guide members to take positive actions in public health governance, so as to carry out more effective global infectious disease control efforts. At present, China’s battle against COVID-19 has entered the second half of “preventing the importation from abroad and the rebound from within”. As novel coronavirus strains continue to mutate abroad, the fight against the epidemic is facing new challenges. How to better respond to new challenges? China’s fight against the epidemic since 2020 has fully demonstrated the strengths of the socialist system with Chinese characteristics, but there are also some problems that cannot be ignored [1]. To give full play to the institutional effectiveness of the established system of major epidemic prevention and control, it is necessary to strengthen the system through continuous reform. The COVID-19 response has once again highlighted the unique political and institutional advantages of Governance in China and demonstrated the CPC’s extraordinary ability to navigate complex situations and respond to major risks and challenges. While recognizing the significant advantages of China’s governance, we should also be soberly aware of the shortcomings

in responding to COVID-19 and other emerging infectious diseases. The most important is that the monitoring and early warning system of emerging infectious diseases is not perfect.

2 Current Situation of Infectious Disease Surveillance and Early Warning System in China

Since reform and opening up, China has made great achievements in economic and social development, but the level of health, especially disease prevention and control, is not commensurate with the level of economic development.

Monitoring and early warning refers to the dynamic observation and monitoring of various potential hazards, threats or social and economic operation status through technology, scientific assessment of the risk degree of various emergencies, and timely notification or potential victims who may be affected according to the relevant risk information, and finally make necessary early warning actions. Monitoring and early warning system is the standard and procedure of monitoring and early warning behavior, which helps to ensure the scientific and effective development of monitoring and early warning work. Timely and accurate monitoring and early warning is the key to control, reduce and reduce the harm of infectious diseases. Therefore, countries all over the world attach great importance to the surveillance and early warning of infectious diseases and establish and constantly improve the surveillance and early warning system of infectious diseases in practice. In China, the SARS incident in 2003 fully exposed the shortcomings of the surveillance and early warning system of infectious diseases in China [2].

3 The Mechanism of Member Obligations in Global Governance

The international community has a rigid demand for global governance of public health security. The international system is positively correlated with the needs of the international community. When its existence can reduce transaction costs, improve information transparency [3], and have service functions, countries will know how to obtain the maximum benefits at the minimum cost within the framework provided by the international system, so as to weaken the negative benefits of anarchy and increase international cooperation [4]. Global public health governance is driven by high demand, and members are willing to undertake corresponding obligations within the framework of the system in order to obtain institutional dividends under the governance system. In other words, membership obligations in global governance are guided by the needs of certain necessary members and the pursuit of common interests. The international system is formed through international contracts, and members voluntarily choose to abide by the international system and assume corresponding obligations within the framework of the system [5].

4 The Problems in Disease Prevention and Control

4.1 The Epidemic Information Disclosure System and Reporting Mechanism

The epidemic information disclosure system and reporting mechanism are inefficient. According to Chinese law, only administrative departments have the right to release

and disclose information related to the epidemic [6]. The CDC is a public institution under the jurisdiction of the Health Commission [7]. Its main function is to scientifically investigate diseases and propose corresponding countermeasures. However, CDC faces a dilemma in its function orientation. As a research institution, it has to answer to the Executive director, and as an institution, it lacks independent management authority [8]. This epidemic adopts the traditional manual reporting method, abandoning the online direct reporting system of infectious diseases established after SARS, which delays the precious epidemic early warning time [9].

4.2 The Information Coordination Mechanism

The information coordination mechanism between CDC and medical institutions is not perfect and sound [10]. CDC cannot directly obtain disease-related information from medical institutions, which increases the cost of information acquisition. CDCs and medical institutions have different primary tasks, and their medical staff are also different in their sensitivity to disease-related information. For example, clinicians treat patients mainly for symptoms and seldom consider the possibility of infectious diseases [11]. CDC doctors, however, focus more on the number of patients who develop similar symptoms in a short period of time, looking for the possibility of an infectious disease. Medical facilities have a lot of information but are not sensitive to infectious diseases. Meanwhile, the CDC is sensitive to infectious diseases but lacks information.

5 Suggestions

Update relevant laws and regulations on disease prevention [12]. At present, some laws and regulations on disease prevention do not meet the requirements of the modernization of China's governance capacity and system in the new era. We suggest revising and improving relevant laws and regulations. In this case, the reporting process was hospital - district CDC - municipal Health Commission (local government)-provincial health Commission-National Health Commission. The reporting mechanism was long, and the speed of information transmission could not keep up with the speed of the spread of the epidemic [13], thus missing the precious time window. In view of this, it is suggested to update relevant laws, improve the epidemic direct reporting system of "Network direct reporting system for infectious Diseases", promote it to all hospitals across the country, and strengthen the effective operation of the decision support system for major epidemic response [14].

The whole society, especially major epidemic prevention, and control departments, should have a better understanding of the complexity era and risk society, strengthen the awareness of potential dangers, and remain alert to the risks of major epidemics.

The COVID-19 outbreak at the end of 2019 is the most serious public health crisis in the past century, but major outbreaks since the end of the 20th century are not accidental public health crises. In fact, since the 1980s, not only some previously dangerous and controlled infectious diseases have reappeared, but more than 20 new infectious diseases with more serious harm and some of which have unknown causes or transmission channels have emerged. In particular, since the beginning of the 21st century,

one new infectious disease has emerged every year on average. There have been three pandemics of the most severe coronavirus, including SARS in 2003, Middle East Respiratory Syndrome in 2012 and COVID-19. The emergence of these infectious diseases has its direct causes in epidemiology, but fundamentally shows that human society has entered a complex era.

The advent of the era of complexity and risk society requires the whole society to have a clear understanding of the more complex situation and more severe challenges, strengthen the awareness of potential dangers, and stay alert to risks. It's a big biological safety question. Therefore, it is necessary to strengthen the bottom line thinking, strengthen risk awareness, and always prevent major health risks. In the prevention and control of major epidemics, the government should advocate early detection, early reporting, early isolation and early treatment.

In accordance with the general requirements of the operation of the public sector, the government needs to build a major epidemic information monitoring network, strengthen mechanism building, and improve the capacity of the major epidemic information monitoring system. At the same time, we will actively explore the working mechanism of a decision support system for dealing with major epidemics based on awareness of potential dangers and risks. In accordance with the requirements of the modernization of national governance and coordinated governance, it is necessary to strengthen the operation mechanism of the information system based on the organic link between the whole and the local, and improve the capacity of the information monitoring system for major epidemics.

First, we need to integrate surveillance agencies related to major epidemic information, improve their functions, and further strengthen the surveillance network for major epidemics. As mentioned above, after the outbreak of SARS in 2003, China strengthened the construction of disease control system, and quickly formed disease prevention and control institutions, medical institutions and disease prevention and control system. However, due to the advent of complex times and risk society, the economic society has a stronger demand for major epidemic risk surveillance and its scope is wider. In addition to the powers and responsibilities of some departments, such as market management and quarantine inspection, it is also necessary to integrate relevant institutions as soon as possible, improve their functions and regulations on powers and responsibilities, and further strengthen the major epidemic surveillance network.

Grassroots self-governing organizations refer to community committees, villagers committees and villagers groups. Grassroots organizations have become the foothold of epidemic prevention and control since the outbreak of COVID-19. However, in fact, these self-governing organizations at the grass-roots level, especially the urban community networks that have widely implemented networked management, have a better understanding of the daily life of the masses within their jurisdiction. With the improvement of community cadres' basic quality of public health and disease prevention and control, it is fundamental and important to obtain the information of unknown diseases and abnormal health events under normal conditions.

Retail pharmacy. Patients with major outbreaks usually have some obvious symptoms, such as fever and cough from COVID-19 patients. Some people infected with the pandemic often go to pharmacies to buy medicines because they do not know or are

unwilling to go to a hospital. At present, in the fight against COVID-19, many local pharmacies have implemented real-name drug procurement, which is an important way to monitor epidemic information.

Second, the government should strengthen the monitoring of diseases of unknown cause and abnormal health events, standardize the reporting of major epidemic monitoring data, and establish cross-level communication of monitoring data needed for the overall management of major epidemic diseases in the region. Based on the construction of existing laws, regulations and systems, the construction of key epidemic surveillance information system should at least carry out the following work.

There is a need to pay more attention to unexplained diseases and abnormal health events and establish corresponding reporting mechanisms. At present, due to the advent of complex and risk society era, not only the vicious infectious diseases that ravaged humanity in the past have re-emerged, but also diseases of unknown cause and abnormal health events (such as SARS, Middle East Respiratory Syndrome and COVID-19) are emerging with increasing frequency. In China's current major epidemic direct reporting system, although the diseases of unknown cause and abnormal health events are also involved, they are usually classified into corresponding disease categories according to their manifestations, which may objectively reduce the risk of these infectious diseases. Therefore, risk awareness should be continuously strengthened, and sufficient vigilance should be maintained for diseases of unknown cause and abnormal health events based on the continuous construction of a major epidemic surveillance network.

(4) Governments at all levels in China must promote timely and centralized analysis of major epidemics, make policy planning for major epidemics more scientific, and enhance the support capacity of the decision-making and advisory system for major epidemics. On the basis of timely monitoring of major epidemic cases and effective integration of monitoring information, the operation mechanism of the decision-making consultation system must be improved based on the requirements of overall governance. Policy makers need to make timely analysis and centralized research and judgment on the corresponding nodes of the governance network, so as to form a professional decision-making consultation scheme and provide strong support for timely and scientific decision-making.

Based on the Center for Disease Control and Prevention, strengthen system and mechanism construction, and carry out timely professional analysis of major outbreaks. The timely professional analysis means timely professional biological, medical and epidemiological analysis of major emergencies, unexplained diseases and abnormal health events. At present, district and county CENTERS for Disease Control and Prevention (CDCS) are the grass-roots institutions for disease control and prevention in China, as well as the first gathering point of surveillance information in the overall management of major epidemic diseases. Therefore, county-level centers for disease Control and Prevention and corresponding medical institutions are the starting point for the whole timely professional analysis. The government should carry out follow-up work as soon as possible according to the operation requirements of the decision support system for dealing with major epidemic in the complex era and risk society.

With the support of big data technology, the "governance implications" of major epidemic surveillance data will be displayed in a timely manner. On the one hand, existing

data systems should be interconnected to grasp the significance of monitoring data in time. For example, after the system of unexplained diseases and abnormal health events is established, it must be timely compared and analyzed with relevant data systems such as birth and death. On the other hand, governments at all levels should improve major epidemic classification indicators and different types of unknown diseases and abnormal health events, and form an intelligent multi-point trigger mechanism for major epidemic early warning.

6 Conclusion

The government needs to focus on strengthening the construction of talented personnel. The effectiveness of theory dissemination is closely related to the quality and ability of the subject of theory dissemination. Cultivating theoretical communication talents can produce high-quality content, build powerful communication channels and gather theoretical communication audiences. The important content of strengthening the construction of theoretical communication media is to train high quality theoretical communication talents. The media should strengthen the education and training of theoretical editors, improve the political quality, theoretical literacy and editing professional level, realize the transformation from a single theoretical editor to a whole media theoretical editor, and provide strong talent and intellectual support for the dissemination of theory. Theoretical dissemination workers should actively improve the dissemination of innovation theory and socialist thought.

This study attempts to reveal the types and characteristics of information release for public health emergencies. This paper takes THE COVID-19 outbreak as an example to make a preliminary analysis of the information released by the NHC and Hubei Provincial Health Commission, the World Health Organization, the Center for Disease Control and Prevention, and the Ministry of Health of Singapore in this event, revealing the types and characteristics of information released in public health emergencies. On this basis, some suggestions are put forward to improve the information release of public health emergencies. The limitation of this study lies in the small number of websites of departments and institutions selected, and the number of information released for analysis may not be enough to cover all the information released related to the epidemic. Meanwhile, the release of relevant information changes from time to time even during the pandemic (such as URL changes, content migration, updates). Internationally, with the development of the epidemic in different countries, the content, frequency and method of release are also dynamic. Therefore, there are some deviations in the results of this study. In the future, we will continue to expand the sample size, use data mining and analysis methods to discuss relevant information released by relevant departments at all levels, and further analyze the characteristics and quality of information released by different departments and institutions in the face of public health emergencies. In addition, future research can investigate the public's information needs in the case of public health emergencies, so that relevant departments can carry out information release activities more effectively in the face of emergencies and ensure the authority and credibility of information release.

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