

Reflections on the Construction of China's Public Health Emergency System in the Post-Pandemic Era

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Abstract: Public health emergency refers to major infectious disease outbreaks, mass unexplained diseases, major food and occupational poisoning and other events affecting public health that occur suddenly and cause or may cause serious damage to the public health. This kind of event has the characteristics of suddenness, public attribute and serious harm, which can cause significant impact on national economy and social stability, and the completeness of public health emergency system plays an extremely important role in its prevention and control. The aim of this study is to analyze the current status of the development of health emergency management in China and the problems that exist in it, so as to provide a reference for the improvement, construction and implementation of the public health emergency management system. Cases of major and severe public health emergencies in China were analyzed along with the relevant health emergency management literature. China's public health emergency system gradually improved during the last decade. However, there are some shortcomings still exist in it, like early warning functions for infectious disease surveillance are unable to perform timely, lack of a unified information-sharing platform, shortage of public health manpower and so on. Constructing a sound and scientific emergency management mechanism is a lengthy and challenging process. Suggestions from five aspects: emergency management system, emergency protection, basic construction, disease control talents and public awareness are proposed to contribute to the further promotion of the construction and improvement of the emergency response system for public health emergencies in China.

Keywords: Public Health Emergency, Emergency Management, System Construction, Post-Pandemic Era

1. Introduction

A case of unexplained pneumonia appeared in Wuhan, Hubei Province, China, in December 2019, which was later found to be a severe respiratory syndrome and inflammatory lesion of the lungs caused by severe acute respiratory syndrome coronavirus 2 (SARS-COV-2), naming the disease as Coronavirus Disease 2019 (COVID-19) [1, 2]. The COVID-19 pandemic is responsible for millions of deaths globally [3, 4]. And it not only poses a threat and challenge to public health and life safety, but also a severe test in the field of public health emergency management and social governance system in China [5, 6]. Assessing impacts and strengthening emergency management have become the top priorities for the Chinese government [7].

2. Background

The effective response, scientific prevention and control of public health emergencies are inseparable from the national public health emergency management system. The crisis that broke out in China in 2003 was a major public health event, after the experience of SARS, China's emergency management system construction stepped into the fast lane of development, with "one case, three systems" as the basic symbol of the gradual completion of the emergency management system [8, 9]. Since then, remarkable effects have been achieved in preventing and warding off influenza A and avian influenza, such as H1N1 in 2009 and H7N9 in 2013 [10]. After the outbreak of the COVID-19, governments at all levels and the general public responded positively and took necessary and strong preventive and control measures to

effectively curb the spread of the epidemic and give strong guarantees for social stability, and also providing an empirical reference to countries around the world in their fight against epidemics. However, the coping process has also revealed that China's public health emergency capacity is still fragile, and the construction of the public health emergency system is in urgent need of improvement. Based on the comprehensive analysis of China's emergency management system, this paper puts forward suggestions and countermeasures in five aspects, including emergency management system, emergency security, grassroots construction, CDC talents and public awareness, in order to provide reference for the improvement of the emergency response system for public health emergencies.

3. Public Health Hardware Facilities

3.1. Failure to Perform Early Warning Functions for Infectious Disease Surveillance

After the SARS outbreak in 2003, China has invested huge sums of money and a lot of manpower to establish a disease prevention and control system and the world's largest, vertical to the end (above the township level), horizontal to the edge (all health institutions) of infectious disease epidemics and public health emergencies online reporting system [11]. "Infectious Disease Information Reporting Management Specification" [12] clearly stipulates that as long as doctors find clinical cases of infectious diseases, they should report the information to the infectious disease department of the hospital within the specified time limit, and the specialists will fill in the infectious disease report card and enter the reporting system for reporting, and there is no need for layer-by-layer auditing and direct reporting in the system. With this system, it takes an average of two to four hours for surveillance information on public health emergencies such as infectious diseases to be reported directly from healthcare facilities to the national level [13]. This system has played a positive role in preventing the spread of several cases of influenza A. However, it failed to fulfill its function in the early stage of the spread of COVID-19. In addition, this mechanism is unable to obtain the early clinical symptoms and manifestations of the disease, and it is difficult to comprehensively analyze and judge the situation [14], so there is a lag in the early warning of the epidemic, and it is impossible to quickly alert public health events at the early stage of the epidemic.

3.2. Absence of a Unified Information-Sharing Platform

In many cases, the handling of crises requires the coordination and cooperation of multiple departments. However, at present, there is no effective information sharing and communication mechanism between health departments at all levels in China, which not only leads to information silos, but also may lead to information disorder, leakage and other problems. There is also a lack of positive information interaction between the government and the public. When a

public health emergency occurs, some local governments and relevant departments first consider shielding the information from the public, resulting in the public choosing to believe in false information from unofficial channels and causing panic.

3.3. Infrastructure to Be Improved

After a public health emergency, the number of cases can increase rapidly, leading to a strain on medical resources. For example, after the outbreak of the new coronary pneumonia epidemic, the number of cases of patients in serious areas far exceeded the carrying capacity of the local health care system, such as Wuhan City, where the number of patients at the peak of the fever clinic exceeded 15,000 throughout the day [15]. In order to alleviate the pressure on the healthcare system, China has chosen to adopt the practice of establishing the Xiaotangshan Emergency Hospital, which is divided into temporary new construction and temporary requisition. It can be seen that the current public health infrastructure in China's megacities and mega-cities still has some deficiencies in meeting the demand for treatment in the face of the surge of patients caused by large-scale emergencies [11]. In addition, our country still lacks a stockpile of emergency supplies. In a public health incident, without a certain amount of stockpiles of urgently needed materials such as medical equipment, medicines and masks, it is impossible to meet the needs of patients and health care in a timely manner. In addition, there is a lack of well-established emergency evacuation routes and evacuation facilities. In the event of a public health emergency, evacuation and isolation of people is a very important initiative, but the evacuation routes and isolation areas in some places are not closely planned, and there is even a lack of emergency communication and power facilities.

3.4. Shortage of Public Health Manpower

The CDC team is the standing army for maintaining national public health security, and is the main force for implementing the core policy of "prevention first" in the strategy of Healthy China [16]. However, due to the general decline in the income of public health institutions, and assessment of titles and prospect is limited, the gradual decline in the number of practitioners, personnel loss of grass-roots organizations is serious. According to the "China's health care development statistics bulletin" (2009-2020) combining statistics found that the total number of CDC personnel in China is in a state of continuous decline, and the total number of CDC personnel decreased by 4.5% during 2009-2019. With the occurrence of epidemics, the importance of public health for national security and people's health continues to be emphasized, human resources for public health have gradually increased. Currently, there are 158,000 health technicians in the country, the highest level since 2009 [17].

3.5. Inadequate Funding and Limited Types of Insurance

The public health system is mainly funded by fiscal input

[18]. In 2014, the project allocation for the national public health special task funding was RMB529 million, and by 2019, this budget dropped to RMB450 million, a year-on-year decrease of 14.9% [19]. Public health investment is uneven between regions and districts, with a large gap between urban and rural areas, and many regions have limited investment to meet the needs of modernized public health emergency management. According to the public budget of the National Health Commission in 2019, the annual allocation invested in public health promotion is only 7 million yuan, which is far from enough to play an effective promotional role for a populous country like China. Besides, the insurance industry in China has very limited types of insurance, which makes it difficult to cover the risk losses of the public in the event of an emergency, which increases the pressure on the country's protection.

3.6. Low Awareness and Lack of Knowledge of Emergency Response for the Whole Population

The outbreak of COVID-19 has exposed the weak awareness of self-protection, prevention of infectious diseases, civic responsibility and other precautions taken by the Chinese people in the event of public health emergencies. The public lacks knowledge and understanding of public health emergencies, underestimating the threat of such events, thus ignoring the corresponding prevention and response measures. They may even fail to understand the measures taken by the government and relevant departments, spreading false opinions on the Internet to induce the public to resist the government and relevant departments and not cooperate with their work.

4. Countermeasures and Recommendations

4.1. Improving Public Health Emergency Management Systems

On the one hand, there is a need to refine the current monitoring system for public health emergencies and the mechanism for direct reporting of infectious diseases on the Internet, so that infectious diseases that cannot be categorized according to known criteria can be reported as much as possible, rather than misreported, so that they can be investigated and researched in the first instance. On the other hand, it is necessary to improve the information release system and establish a press conference system for public health emergencies led by the government with the participation of various departments. And the relevant departments should strengthen the communication with the news media, timely release of important news and first-hand information, to the community to make the appropriate early warning, to minimize the public panic caused by inaccurate public opinion. In addition, the establishment of a centralized, unified and efficient emergency decision-making and command system is needed to set up a timely response to the

decision-making and the professional prevention and control measures to be taken, and to quickly and efficiently organize and coordinate the prevention and control resources. At the same time, consideration should also be given to the full cycle of emergency management, forming a working model that combines usual services with emergency response in the event of a public health emergency, rather than merely introducing policies and measures on an ad hoc basis during the process.

4.2. Promoting Public Health Infrastructure at the Grassroots Level

In recent years, China's investment in public health infrastructure has gradually increased, from the national level to the provincial and municipal levels to the community, covering virtually all levels of society, making it possible to flow and transmit information and experience in a timely manner, and to update national-level guidelines for epidemic prevention in a realistic manner in accordance with the actual situation. Basic public health services are mainly undertaken by primary health care institutions, including the construction of community health service centers, which play an important role in carrying forward and downward in the collection of information from residents' health records, the handling and reporting of infectious diseases and public health emergencies, health education, health management, preventive vaccination, and health supervision and co-management. The community is the basis for the implementation of grid-based management, and is the first line of defense for prevention and control in China. The effective construction of the community will help curb the occurrence and spread of public health emergencies. On the one hand, communities still need to strengthen the popularization of public health knowledge and publicity and education, and to raise the public's health awareness and self-care ability; on the other hand, they need to strengthen social health management, implement responsibility to the post, and strengthen the supervision and inspection of the community's health environment, so as to prevent laxity in management and substandard hygiene, etc., and to further consolidate and develop the community health management system that has already been established.

4.3. Strengthening Public Health Personnel Training

First of all, it is the need of the hour to vigorously develop domestic public health education. During the global epidemic of new coronary pneumonia, Tsinghua University took the lead in establishing the School of Public Health, and since then, many colleges and universities have set up it one after another. The country should revise and improve the development plan of public health personnel at all levels and talent training programs, and colleges and universities should deepen their cooperation with CDC and other institutions to cultivate high-end and practical composite public health talents for the country. Secondly, we should pay attention to the career development of public health talents, and should

improve the incentive mechanism of public health staff as soon as possible, and improve the salary and welfare treatment. At the same time, it is also necessary to broaden their career development space to ensure personnel stability. At present, most of China's public health personnel are categorized as professional and technical personnel of institutions, according to the current "Trial Measures for Job Setting Management of Institutions" [20], the approved ratio of senior titles is lower for public health personnel working at the grass-roots level, which will hit their work motivation, resulting in a brain drain. The government can consider allowing the public health system to customize a more scientific and reasonable job grading and promotion method based on its own actual situation to prevent personnel from choosing to leave due to limited career prospect.

4.4. Improving the Emergency Support System for Public Health Emergencies

In terms of material reserves, a unified national system of strategic material reserves should be established to increase material security and provide strong material security for emergency response. For the coordinated distribution of materials, the Internet and big data can be used to develop a key material deployment system, real-time sharing of information around the world, the government can pay close attention to the shortage of materials, to achieve efficient scheduling. In terms of material donation, can build medical institutions and social organizations donation synergy mechanism to make the process legal. For the donation of medical supplies, the donation of medical supplies, the donation of medical supplies and social organizations should first determine the donation intention with the donor and collect specific gap material information, such as model, manufacturer, batch, etc., so as to achieve accurate donations to prevent waste of resources [21]. In terms of funding, emergency response funding should be increased, and in particular, funding for grass-roots units needs to be increased substantially to raise the level of grass-roots health emergency response. At the same time, funding channels for public health system funds should be broadened and a long-term stable funding mechanism should be established. In addition, insurance has the basic functions of risk diversification and economic loss compensation, as well as the derived functions of saving fund, supervision of risk and social management [22]. Insurance companies can innovate and optimize insurance products according to social realities, expand the scope of insurance responsibilities of existing products, and carry out digital transformation and upgrading to provide efficient online services.

4.5. Enhancing Public Awareness of Emergency Response and Sense of Citizenship

Emergency education should focus on improving the public's emergency response capabilities, starting at an early age. Primary and secondary schools should be the first place to promote and popularize emergency education, set up

relevant curricula, formulate scientific and effective teaching materials, establish a sound assessment system, and regularly arrange emergency drills, so as to cultivate citizens' awareness of crises and their ability to cope with them from an early age. Secondly, emphasis should be placed on publicizing emergency knowledge and skills within the community, which can be disseminated through various channels such as TV, WeChat, books and so on. Communities can strengthen publicity and education, organize regular lectures and emergency drills on relevant topics, and mobilize the public to actively participate in enhancing their emergency awareness and ability.

5. Conclusion

The natural and social environments of today's world are becoming increasingly diversified and complex, and public health emergencies such as the Ebola, SARS and epidemics have posed great challenges to social stability and human health. Due to the impact of the epidemic, public health emergency management has been emphasized more and more, and strengthening the system is the trend of social development in the post-pandemic era [23]. Therefore, the task of improving the public health emergency response system should not be delayed, and a modernized public health emergency system adapted to the development of the times can be established by starting with the public health emergency response management system, grass-roots construction, public health personnel, the protection system and the emergency response awareness of the whole population.

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Conflicts of Interest

The authors declare no conflicts of interest.

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