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Discussion

A reflection on the anti-epidemic response of COVID-19 from the perspective of disaster management

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ABSTRACT

The outbreak of coronavirus disease 2019 (COVID-19) shocked the world as it spread rapidly from continent to continent, and finally, it became a pandemic resulting in many infected patients, with an increasing number of deaths, and a devastating effect on worldwide economics. People only know that epidemic or pandemic is a rapid spread of infection, but in fact it can also be regarded as a biological disaster, which can be managed from a perspective of disaster management. This article discusses the current situation of the anti-epidemic response of COVID-19, and suggests using a disaster management approach to better handle this pandemic situation through mitigation, preparedness, response and recovery.

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What is known?

- Disaster is defined as a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.
- A pandemic is known as a global outbreak of a serious infection disease.

What is new?

- A pandemic is also regarded as a biological disaster and therefore can be better managed from a perspective of disaster management.

1. An overview of coronavirus disease 2019 (COVID-19) pandemic

The COVID-19 epidemic or pandemic is an ongoing spread of coronavirus disease identified in 2019 (COVID-19) [1]. The outbreak was first reported in Wuhan (China) at the end of December 2019, but the source was still unclear [2]. Hong Kong (China) reported the first confirmed COVID-19 patient on 22 January 2020 [3], and then gradually the number of confirmed cases increased. The World Health Organization (WHO) declared the outbreak to be a Public Health Emergency of International Concern (PHEIC) on 30 January 2020 [4]. During the early stage of the COVID-19 outbreak, the number of infected cases continued to grow. Some problems emerged including the absence of a public health emergency response system for making contingency plan and for coordinating the anti-epidemic response action; and lack of adequate manpower (such as nurses and doctors with critical care experiences) & resources (such as masks, personal protective equipment, & ventilators). The situation continued to get worse, COVID-19 continued to spread from continent to continent, and finally WHO officially declared the COVID-19 outbreak as a pandemic on 11 March 2020 [5].

2. Epidemic/pandemic is a biological disaster

Many people have just known that epidemic is a local outbreak of an infectious disease, but most of them actually do not aware that an epidemic is being classified as one kind of biological disaster. Disaster is defined as a serious disruption of the functioning of a community or a society causing widespread human,
mitigation, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources. Also, such event overwhelms local medical capacity and requires a request to the national or international level for external assistance [6]. Disaster can be classified as a natural and man-made disaster, and natural disaster can further be subdivided into 5 subgroups [7] as: geophysical (e.g. earthquake); meteorological (e.g. storm); hydrological (e.g. flood); climatological (e.g. heatwave) and biological (e.g. epidemic). Here, it is shown that epidemic belongs to a biological disaster, and therefore epidemic can be better managed from a perspective of disaster management.

The usual natural disaster such as earthquake results in a large number of trauma patients which require trauma management including airway management, breathing support, circulatory intervention and wound care; whereas epidemic results in a large number of infected patients, which require infection control measures and medical treatment including the use of anti-microbial drugs and vaccines. Although the nature of the disaster and the format of management differ, however, the concept and approach of management are similar. According to WHO, the disaster management cycle has four components, which include mitigation (reducing risk); preparedness (providing training and drills); response (caring for medical rescue), and recovery (reconstructing physical, psychological, and social health) [8]. To manage a biological disaster or epidemic more properly and effectively, the healthcare system should reduce the disaster risk before it happens (mitigation); equip the healthcare team and public adequately before the epidemic outbreak occurs (preparedness); dispatch a public health emergency response team to control and treat the infection (response); and facilitate those infected patients and infected healthcare workers (HCWs) to recover physically, psychologically and socially. Let us take a look at the current COVID-19 pandemic situation, and discuss how epidemic/pandemic can be better managed from a perspective of disaster management.

3. A reflection on the anti-epidemic response on COVID-19

3.1. Mitigation

Mitigation refers to the pre-disaster risk reduction phase, which is a phase for preventing disaster risk so as to reduce the number of infected patients or deaths. The healthcare system needs to take some measures before the epidemic occurs to reduce the disaster risk of the community, so as to reduce the number of infected patients or deaths.

3.1.1. Current situation
3.1.1.1. Legal system to ban trading and eating wild animals. It is noted that some countries still have the habits of trading and eating wild animals, so it is necessary to set up legal regulation to stop these activities, otherwise epidemic outbreak may still occur in future [9].

3.1.1.2. Lack of a public health emergency response system. Many countries still do not have a public health emergency response system. Even they have such system, many of them are usually unfunded and unstaffed, and this will make the overall coordination of the anti-epidemic work ineffective [10].

3.1.1.3. Lack of manpower and resource planning during the initial phase of the outbreak. During the initial phase of the COVID-19 outbreak, it was noted that the local healthcare systems of many countries/regions did not have adequate medical staffing and capacity to combat such a novel coronavirus outbreak [11]. Identified problems included inadequate nurses with intensive care experiences for managing critically ill COVID-19 patients; inadequate mask and PPEs for protection; inadequate machines (e.g. ventilators) for providing life-saving support; lack of effective guidelines to control infection; lack of quarantine centers to isolate suspected cases; and lack of temporary hospitals to manage confirmed cases during the initial phase of the epidemic [12].

3.1.2. Suggestions
3.1.2.1. Promoting public education & reinforcing law. Even if a legal regulation to ban trading and eating wild animals is in place, however, some people may still not comply to such law. So, more public education and law reinforcement on this issue are needed to make people aware of such risk, and to prevent any further outbreak of new infection in future everywhere in the world.

3.1.2.2. Setting up effective public health emergency response systems or networks in every country/region. This is important so that whenever there are any suspected cases of new infection, investigation & corrective measures can be carried out immediately to prevent an outbreak, and the system can also alert all other countries to do preventive measures.

3.1.2.3. Developing better manpower and resources planning. The local healthcare system should work closely with the public health emergency response system to work out an anti-epidemic plan, which can include: deployment of healthcare teams to the outbreak zone within 24 hours after the outbreak; activation of an emergency production lines or factories to produce adequate resources (including mask, PPE, ventilators) to meet the needs of the outbreak zone; developing standards and procedures to guide healthcare teams to prevent infection (including standards for isolation room set-up); and reserving venues for developing quarantine centers or temporary hospitals.

3.1.2.4. Encouraging citizens to pursue medical insurance. It is a good practice to encourage more citizens to pursue medical insurance, so as to unload the economic burden of the citizens and the government during and after the epidemic. Because some COVID-19 patients may need a longer period of hospitalization and rehabilitation, pursuing medical insurance may help cover some of the medical expenses.

3.2. Preparedness

Preparedness refers to the pre-disaster preparation phase, which is a phase for capacity building. The local healthcare system needs to organize and provide adequate training and drills related to anti-epidemic activities to healthcare teams and the public.

3.2.1. Current situations
3.2.1.1. Lack of anti-epidemic training. After the epidemic of SARS 2013, Influenza 2009 and Ebola 2014, many people are more aware of the importance of infection control, so many training related to basic infection control have been arranged for health care workers (HCWs). But infection control training related to managing critically ill infected patients is still largely inadequate [13]. These training could include: using high flow oxygen devices, using non-invasive ventilators, insertion of endotracheal intubation, using mechanical ventilators, and performing cardiopulmonary resuscitation. HCWs have a high chance to contract infection when participating in these procedures.

3.2.1.2. Lack of anti-epidemic drills. There has been lots of disaster drills arranging for HCWs to prepare them to manage the natural
disasters including earthquake, forest fire, and aviation accidents, but large scale drills related to the anti-epidemic activity is not common [14].

3.2.1.3. Lack of education to the public related to anti-epidemic activity. The general public may have the concept of performing basic hygiene (such as putting on a mask and doing hand hygiene), but they may not familiarize with other hygienic practices that can help reduce the spread of infection such as social distancing and home quarantine [15].

3.2.2. Suggestions

3.2.2.1. Organizing regular training for HCWs for managing critically ill patients. Regular training should be arranged for HCWs to handle high-risk procedures such as using high flow oxygen devices, insertion of endotracheal intubation, performing cardiopulmonary resuscitation, so as to reduce their chance of contracting the infection.

3.2.2.2. Arranging regular anti-epidemic drills for HCWs. Anti-epidemic drills should be arranged to healthcare teams regularly to empower them to have the capacity to combat infection. Anti-epidemic drills should include: dispatching healthcare team to a simulated site of the epidemic outbreak; mobilizing medical resources (e.g. mask, PPE, ventilators) to the simulated outbreak zone; setting up quarantine centers to do screening and triaging for suspected cases, setting up temporary hospitals for managing confirmed cases of infection, and better job division to different healthcare teams.

3.2.2.3. Fostering public education. Other than reinforcing the basic infection control practices of putting on a mask and doing hand hygiene, regular talks should be arranged via education classes or through mass media (e.g. television, radio) to promote the concept of cough etiquette, social distancing, home quarantine, avoiding social gathering, and stop eating wild animals.

3.3. Response

Response refers to the intra-disaster emergency response phase, which is a phase of confronting and combating the epidemic directly. The local healthcare system should dispatch a number of healthcare teams with adequate resources to the outbreak zone to combat the infection.

3.3.1. Current situations

3.3.1.1. The COVID-19 outbreak outweighed the medical capacity in many countries. It was noted that the rapid increase in the number of COVID-19 patients outweighed the medical capacity of many countries/regions. And many poor countries/regions required a request to the international level for external assistance [16].

3.3.1.2. Inadequate manpower and resources during the initial response phase. The situation was very chaotic during the initial response phase in most countries/regions, because the manpower and resources during the initial phase in some countries/regions were not able to cope with such big number of infected patients. It resulted in the difficulties of triaging and stabilizing suspected COVID-19 patients, and it might also have delayed the provision of definitive care & evacuation plan [11,12].

3.3.1.3. Heavy workload among mental health teams. During the initial response phase, many people were full of panic and the healthcare workers were exhausting due to the heavy workload. Many of them have developed certain level of acute stress disorder which required the intervention by the mental health team [17]. But because there were too many patients with such problem, it was noted that the mental health team needed to use extremely big efforts in providing psychological first aid to infected patients and healthcare workers.

3.3.2. Suggestions

3.3.2.1. Coordinating all anti-epidemic emergency response activities by the public health emergency response system. There is an urgent need to set up a public health emergency response system or network in every country/region to coordinate all anti-epidemic activities before and after an outbreak occurs. Such a system can provide an anti-epidemic plan, arrange adequate manpower and resources, and coordinate the overall anti-epidemic activities including screening and quarantine services and suggesting different treatment modalities for managing infected patients. This allows better triaging and stabilizing the suspected COVID-19 patients, as well as providing definitive treatment to the confirmed COVID-19 patients. The system can also alert the local medical system about the scale of the outbreak, and estimate the coping capacity of the community so that the local government can have better planning to manage the outbreak. If such a system or network was in place before the outbreak, the initial emergency response would have been done in a much organized and effective manner in many countries/regions, and the epidemic could have been controlled in a better manner.

3.3.2.2. Sharing mental health services. Other than the formal mental health team, some basic training on providing psychological first aid should also be taught to all nurses and doctors who involve in anti-epidemic response. In that case, the workload of the mental health team can be lightened.

3.4. Recovery

Recovery refers to the post-disaster recovery and reconstruction phase, which is a phase of facilitating patients to recover physically, psychologically, and socially. The local healthcare system should provide adequate care and support to facilitate convalescent COVID-19 patients and healthcare workers to recover from their impaired physical function (e.g. impaired lung function), psychological stress, and social problem.

3.4.1. Current situations

3.4.1.1. Rehabilitation team was not included in the initial emergency response team. Many COVID-19 patients presented with poor lung function and poor exercise tolerance. It was noted in many cases nurses started helping COVID-19 patients to do physical exercises to improve their muscle power and physical beings. This was actually a very good practice [18], but rehabilitation can actually be done by a formal rehabilitation team so that nurses could concentrate more on nursing-related care.

3.4.1.2. Short term and long term psychological support. It was noted that psychological support was given to COVID-19 patients and healthcare workers during their hospitalization period. A plan of long term rehabilitation for these patients should also be instituted [19].

3.4.1.3. Social problem. Some COVID-19 patients may lose their job and lose their abilities to support their family in this epidemic [19]. This has created a social problem to many families, and this problem must be addressed.
3.4.2. Suggestions

3.4.2.1. Recruiting the rehabilitation therapists into the emergency response team. If the rehabilitation therapists can be recruited into the emergency response team from the beginning, then they could start the formal rehabilitation services and program for the COVID-19 patients in a more structured and systematic manner, and at the same time, nurses can have more time to concentrate on more specific nursing care to the COVID-19 patients. This idea and practices can be promoted to all other countries/regions.

3.4.2.2. Providing basic psychological support training to all HCWs in the emergency response team. Psychological first aid should not only be the job of clinical psychologists or the formal mental health team, all nurses and doctors who involve in medical response team should receive some basic psychological first aid training so that they can use these skills to help infected patients and the infected HCWs who have developed acute stress disorders during the anti-epidemic mission.

3.4.2.3. Including the medico-social welfare department in the recovery team. As some COVID-19 patients may have lost their job in this epidemic. Patients and their families might have experienced certain financial or economic difficulties during and after this period. The inclusion of the medico-social welfare department into the recovery team may help meeting their economic needs by arranging some social/financial allowance, and providing temporary housing for these patients and families. This arrangement can definitely facilitate them to tide over this difficult time.

4. Conclusion

COVID-19 epidemic is a biological disaster. When such disaster comes, it is so powerful that we can neither withstand nor resist, but we can learn to respond in order to reduce the number of infected cases and deaths. To better prepare for managing an epidemic, one should utilize the framework of a disaster management cycle by: reducing the disaster risk (mitigation); providing adequate preparation to both healthcare teams and public (preparedness); dispatching healthcare team to the forefront to combat the infection (response); and facilitating infected patients to recover physically, psychologically and socially (recovery). To conclude, the initial success of this current anti-epidemic response on COVID-19 in many countries was not only related to the effort of the central government (in many countries) in mobilizing resources to the forefront, but actually the initial success is related to the fact that the healthcare team (including nurses and doctors) is a very good team with passion, dedication and hardworking. HCWs in every country/region are willing to contribute their love and effort in making the success of combating this novel coronavirus. The war between human beings and these coronaviruses still continue, healthcare professionals should use a proactive approach by making use of the concept of disaster management cycle to develop strategies to continue combating these coronaviruses, and one day we might have a higher chance to completely win this battle.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijnss.2020.06.004.

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