

Summary of Current Challenges and Experience in the Prevention and Control of Infectious Diseases

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Abstract

Infectious diseases will not only threaten human health, but also affect social stability and cause large-scale infection, which will lead to psychological panic among the population, affect normal production and life, and disrupt social order. With the increasingly close exchanges in the world, the spread of diseases is more rapid, and a variety of infectious diseases continue to break out, the prevention and control of infectious diseases needs urgent attention. It is of great significance to recognize the current challenges in the prevention and control of infectious diseases, and to summarize from the previous experience of countries in infectious disease prevention and control that there are measures with strong application to deal with the current challenges.

Keywords

Infectious Diseases; Prevention and Control; Challenges; Experience Summary.

1. Introduction

Since the 21st century, infectious diseases have erupted many times, whether SARS in 2003, H1N1 in 2005, or the Covid-19 in 2019, which has caused a huge impact on people's health and social stability. In this context, the United Kingdom, Portugal, the United States and other countries have reported unusual cases of monkeypox, and according to WHO, monkeypox virus has been transmitted from person to person. At the same time, many cases of unexplained acute severe hepatitis in children under 10 years of age have been reported in many countries. With the increasingly close world exchanges, the spread of diseases is also more rapid, and the prevention and treatment of infectious diseases need urgent attention. Therefore, it is of great significance to recognize the challenges faced by the current prevention and control of infectious diseases, and to sum up practical measures to cope with the current challenges from the previous experience of infectious disease prevention and control.

2. Current Challenges in the Prevention and Treatment of Infectious Diseases

2.1. Inadequate Understanding of Prevention and Control of Infectious Diseases

By definition, an infectious disease is one that is caused by a particular pathogen and is contagious. Because of its infectivity, it needs social attention, but there are still some deficiencies in this aspect. When the Covid-19 broke out, academician Zhong Nanshan said that China has not paid enough attention to sudden infectious diseases and has not conducted continuous scientific research. Even though the lessons of SARS were profound, many people treated it as an accident. And the neglect of infectious diseases can easily lead to their rapid spread beyond control. Awareness issues also apply to vaccination. In 2022, data from the National CDC showed that nearly 13 percent, or more than 33 million people over the age of 60,

had not yet been vaccinated. Some elderly people are not familiar with the effects of vaccines and vaccination requirements, and some people think that vaccines are not important. And this is because they do not have a deep understanding and attention to the epidemic. It can be seen that the public's understanding of infectious diseases is insufficient, which is one of the challenges facing the current prevention and treatment of infectious diseases.

2.2. Emerging Infectious Diseases Continue to Emerge and Spread

In 2003, the World Health Organization (WHO) proposed that emerging infectious diseases refer to those caused by new species or new pathogenic microorganisms, as well as those that have caused regional or international public health problems in recent years. In recent years, new types of infectious diseases have been emerging globally since 1940, reaching a peak in the 1980s. Since the mid-1970s, except for a few years that have not been reported, most cases of SARS, H5N1 highly pathogenic avian influenza, thrombocytopenia with fever syndrome (SFTS), Ebola hemorrhagic fever, Zika fever novel and coronavirus pneumonia have appeared in the world at a rate of one or more per year in recent 10 years [1]. In November 2002, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) broke out in China, causing 8,096 people to be infected with SARS-CoV worldwide and 774 deaths. The average fatality rate is 9.6% [2]. SARS-CoV, discovered in dromedary camels in the Middle East, Africa and South Asia since 2012, has spread to 27 countries worldwide, causing a cumulative 2,566 infections and 882 deaths, The fatality rate reached 34.37% [3]. In December 2019, novel Coronavirus (2019-NCoV) was found in China, causing viral pneumonia (COVID-19). By January 2023, the cumulative number of infected people worldwide exceeded 670 million. About 7 million of those patients died. The emergence of these emerging infectious diseases not only causes serious harm to the security of human society, but also tests the ability of public health systems in the world to deal with the prevention and control of emerging and severe infectious diseases.

2.3. The Spread of Disease is Difficult to Control

First of all, in terms of the manifestation of diseases, some diseases have great concealment. Take COVID-19 for example, in addition to ordinary, mild, severe and critically ill patients, there are asymptomatic infected people. While symptomatic patients may be quarantined after going to a doctor, asymptomatic patients may be infected with the virus but have no symptoms, making it difficult to detect, allowing the virus to spread silently. Secondly, China has a large population base, which is also one of the reasons for the difficulty of infectious disease control. Especially in some remote towns and villages, the information is blocked and the health and medical conditions are poor. When they get infected with the virus, they can't get treatment in time and don't know the isolation and protective measures, which will aggravate the disease and affect the health of others. In addition, dense urban populations and high mobility between urban and rural areas, as well as between cities, increase the risk of epidemics spreading. At the same time, economic globalization has brought countries closer together, creating favorable conditions for the spread of infectious diseases. Studies have identified several social and cultural factors leading to the outbreak of zoonotic diseases, such as religious activities, ethnic culture, intensive social behavior, and high-density population mobility, which provide favorable conditions for disease outbreaks [4]. Therefore, it is difficult to cut off transmission routes and control the spread of infectious diseases.

3. Summary of Experience in Prevention and Treatment of Infectious Diseases

3.1. Strengthen Publicity and Science Popularization to Improve the Public's Awareness of Infectious Diseases

Popularization of science plays an important role in the prevention and treatment of infectious diseases. Providing the public with authoritative popular science knowledge and interpreting the prevention and control measures of infectious diseases can help the public correctly understand the development trend of infectious diseases, master the prevention and control knowledge of infectious diseases, and improve their self-protection awareness and ability, which can reduce the risk of infection and avoid panic. China's National Action Plan for Malaria Eradication (2016-2020), the National Action Plan for Measles Eradication (2006-2012) and many other infectious disease eradication plans have listed strengthening publicity and science popularization as the focus of infectious disease prevention and control work. In addition, the United States government also attaches great importance to the promotion of infectious disease prevention and control. The Centers for Disease Control and Prevention of the United States provides a large number of common-sense materials for free, and often invites doctors and experts to explain and demonstrate in the community to help the people establish a habitual awareness of prevention [5]. Taking the Soviet Republic of China as an example, its main control areas are Jiangxi and Fujian. The poor sanitation conditions and the lack of knowledge of disease prevention and treatment of the people in these areas often lead to the prevalence of infectious diseases such as malaria, dysentery and scabies. And because the people in the Soviet Union lack the knowledge of infectious diseases, once the infectious disease breaks out, some people will flee the epidemic area, often leading to the spread of the epidemic. After the establishment of the Soviet Republic of China, flexible and diverse measures have been taken, Carry out the publicity and popularization of scientific knowledge of disease prevention and treatment among the masses. If it uses its official newspaper "Red China" for publicity. Publicize the health knowledge of the people in the Soviet area by posting slogans, performing programs and other forms, and teach them simple and easy scientific knowledge and methods of disease prevention and treatment, which has played an important role in alleviating the epidemic of infectious diseases in the Soviet area [6]. It can be seen that the importance of popular science work in the prevention and control of infectious diseases cannot be ignored.

3.2. Improve the Infectious Disease Monitoring System

Infectious disease monitoring is an important work of infectious disease prevention and control, as well as one of the important means of early warning and prediction of infectious disease epidemic situation. The construction and implementation of infectious disease monitoring can help understand the epidemiological characteristics of infectious diseases and evaluate the effectiveness of prevention and control measures such as immunization, thus providing a basis for formulating effective prevention and control strategies; Strengthen prediction and early warning, timely detect the epidemic, and take targeted measures to prevent and control the occurrence and spread of the epidemic. China's Code for the Management of Infectious Disease Information Report clearly states that disease prevention and control institutions at all levels must dynamically monitor the epidemic situation of infectious diseases reported through the network every day. Monitoring is also the focus of the work in the prevention and control of infectious diseases. The World Health Organization also emphasized that "Cholera surveillance should be part of an integrated disease", "Local capacity to detect (diagnose) and monitor (collect, compile, and analyze data) cholera incidence, is central to an effective surveillance system and to plan control measures.", It can improve the efficiency of epidemic information collection, release epidemic information through multi-channel and diversified channels,

enable people to accurately grasp the progress and change trend of the epidemic, and is conducive to the active prevention and control of infectious diseases. The Department of Defense of America in 1997 established the Global Emerging Infections Surveillance and Response System (GEIS). After several years of operation, managers of the GEIS asked IOM to conduct an independent evaluation of the system's structure and progress. Perspectives on the Department of Defense Global Emerging Infections Surveillance and Response System (2001) concludes that the GEIS is well organized, satisfies the requirements prescribed by the Presidential Directive, and comprises an appropriate response to the threat posed to national security by emerging infectious diseases. Although still in its early stages, the GEIS has made substantial progress toward achieving its goals in protecting the health of U.S. military and civilian populations, as well as global health interests [7]. Therefore, it is of great significance to improve the infectious disease monitoring system for the prevention and control of infectious diseases.

3.3. Increase the Vaccination Rate and Improve the Level of Immunity of the Population

Immunization is an important disease prevention tool that can help prevent disease, reduce people's chances of getting sick, and reduce the rate of severe illness. The main purpose of vaccination is to enable the body to produce natural biological substances that can be used to improve the recognition and defense of organisms against pathogens. According to the dynamic release of China Disease Control and Prevention, vaccination is the most economical, simple and effective measure to prevent infectious diseases. By immunizing susceptible people, the immunization level of the population can be rapidly improved, the immune barrier can be established, the susceptibility of the population to corresponding diseases can be reduced, and the source of infection can be reduced and eliminated. Even the introduction of pathogenic microorganisms does not cause an epidemic in a population. Take smallpox, an infectious disease caused by the variola virus. In its thousands of years of existence, smallpox was highly contagious, widespread, and deadly. And in 1980, the World Health Organization declared that smallpox had been eradicated from the planet, and the smallpox virus had been eradicated because of the global vaccination campaign. In 2023, in the outbreak caused by the Delta variant strain, more than 2,000 infected cases were reported in Shaanxi, and the incidence of severe disease was about 2.2%, while the average incidence of severe disease was 7% before. The most important variable leading to the reduction of severe disease risk was the vaccination rate [8].

3.4. Improve the Process of Case Discovery and Reporting

A clear, rapid and transparent case report can clearly show the country's handling and control of the epidemic and its effect, and show the different stages of the epidemic's development. It can also play a role in calming public panic. First came the discovery of a suspected infectious disease. In the face of sudden or unknown infectious diseases, rapid identification should be carried out. In addition, the system and process of case reporting should be improved, and a channel should be established so that relevant staff and the public can quickly understand the epidemic situation and have corresponding countermeasures. Take the COVID-19 outbreak in China for example. In December 2019, some hospitals in Wuhan, Hubei Province successively found a number of cases of pneumonia of unknown cause with a history of exposure to seafood markets in South China (later confirmed to be named acute respiratory infectious disease caused by COVID-19 infection). After the discovery of the cases, the Municipal Health Commission reported the clinical manifestations and the number of cases in a timely manner, which played a key role in the timely formulation of epidemic prevention policies and the control of the epidemic.

3.5. Properly Dealing with Epidemic Outbreak Sites

Proper disposal of the epidemic outbreak sites is one of the most important links of infectious disease prevention and control. If an outbreak occurs in a place, necessary containment management and report, quarantine and treatment of relevant personnel, research and demarcation of graded risk areas, and logistics support work can properly control the source of infection and cut off the route of transmission. The Book of Han · The Reign of Emperor Ping records: "The first two years of the Yuan Dynasty, Locusts caused drought. For those affected by the disease, houses should be vacated, places of isolation established, medical treatment provided and the necessary medicines provided." It can be seen from the records that houses were arranged by the government as isolation places for the treatment of plague patients at that time. Therefore, the "disease transfer house" was specially set up in the Han Dynasty for the treatment of isolated infectious diseases, which greatly reduced the risk of infection and effectively controlled the spread of the epidemic [9]. This forced isolation has been used ever since. In 2003, SARS, or severe acute respiratory syndrome, broke out in China. In the case of SARS epidemic, China also adopted a series of measures to ensure the implementation of "early detection, early reporting, early isolation and early treatment". At that time, Beijing implemented the strategy of designated hospitals and centralized treatment. The epidemiological survey in the city woven a seamless "SARS" prevention and control network. Take the UK's quarantine policy in 2022. The UK divides the affected areas into high-risk zones and super high risk zones. Set strict regulations on social activities and traffic control in the risk area for sealing and control management. Personnel entering and leaving the place should scan the code in time, and those found to be closely connected will be notified of nucleic acid detection and self-isolation at the first time. (From the latest reading of the UK's policy response to the outbreak). On the whole, the risk of infectious disease transmission can be effectively reduced through the necessary testing and containment at epidemic sites, appropriate medical treatment and elimination, control of infectious sources, logistical support and personnel coordination.

3.6. Strengthening Exchanges and Cooperation with Other Countries

There is no national boundary for viruses. The prevention and control of a global pandemic cannot be achieved without the active exchanges and cooperation of all countries. Strengthening international exchanges can draw on the advanced theories and experience of foreign projects management and disease prevention and control, and promote the improvement of the level of infectious disease prevention and control. At the same time, we can timely grasp the relevant information of imported infectious diseases and prevent them from happening. During the SARS epidemic in China in 2003, China put forward targeted measures to integrate traditional and western medicine to improve treatment. It is necessary to concentrate excellent Chinese and western experts to cooperate closely and study effective treatment methods to improve the cure rate. Therefore, only enhanced international cooperation can ensure victory in the war against the global pandemic.

4. Conclusion

Infectious diseases will not only threaten human health, but also affect social stability and cause a wide range of infection, leading to psychological panic among the population, affecting normal production and life, and disturbing social order. Therefore, the importance of prevention and control of infectious diseases cannot be ignored. With the development of science and technology, people have mastered more treatment technologies and protective measures, and the level of prevention and treatment has been continuously improved. However, it is still necessary to constantly reflect and summarize the experience from the past prevention and

control experience. It is hoped that the level of prevention and control of infectious diseases will continue to improve with the efforts of people to explore and summarize experience.

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