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Coronavirus Pandemic

Comparison between two types of control strategies for the coronavirus disease 2019 pandemic

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Abstract
Different countries have employed various strategies for controlling the coronavirus disease (COVID-19) pandemic because there is no consensus regarding effective control measures in the literature. Epidemic control strategies can be classified into two types based on their characteristics. The first type is the "severe acute respiratory syndrome (SARS)-like epidemic control strategy," i.e., containment. The second type is the "influenza pandemic-like epidemic control strategy" (flu pandemic-like strategy), i.e., mitigation. This paper presents a comparative analysis on the prevention and control strategies for COVID-19 in different countries to provide a reference to control the further spread of the pandemic.

Key words: COVID-19; control strategies; SARS-like strategy; flu pandemic-like strategy.

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Introduction

After the outbreak of the coronavirus disease (COVID-19) epidemic, it took more than two months (until mid-March 2020) to completely control local transmission in China [1]. However, the disease rapidly spread worldwide, and its transmission is still accelerating. On March 11, 2020, the World Health Organization (WHO) declared COVID-19 to be a pandemic [2]. The associated healthcare utilization and economic loss are unprecedented [3]. Different countries have employed various strategies to control this epidemic because there is no consensus regarding effective control measures in the literature.

Comparison of Epidemic Control Strategies Between China and Other Countries

Epidemic control strategies can be classified into two types based on their characteristics. The first type is the "severe acute respiratory syndrome (SARS)-like epidemic control strategy," i.e., containment, implemented by China [4,5], Singapore [6,7], South Korea [8], and Thailand [9]. The second type is the "influenza pandemic-like epidemic control strategy" (flu pandemic-like strategy), i.e., mitigation, implemented by the USA [10], Japan [11], Italy [12], France [13], and Switzerland [14]. The two epidemic control strategies differ in the following aspects.

Differences in epidemic control

The "SARS-like strategy" focuses on disease prevention and emphasizes three aspects of infectious disease control: infection source, transmission route, and susceptible populations. The "flu pandemic-like strategy" focuses on reducing the transmission speed and advocates that COVID-19 transmission cannot be completely blocked and we can only slow down its transmission speed until the population develops an adequate immune barrier, the epidemic intensity decreases, and it becomes a seasonal infectious disease such as influenza.

Differences in epidemic control ideas

The "SARS-like strategy" advocates short-term severe losses to avoid even greater health and socioeconomic losses. The "flu pandemic-like strategy" advocates that excessive epidemic control strategies would affect normal production and life in the society and do not conform to the cost–benefit principle.

Differences in specific epidemic control measures

In the "SARS-like strategy," on the one hand, the "five early" principles (early detection, early report, early investigation, early isolation, and early treatment) were adopted, and confirmed and suspected cases were concentrated for treatment until the medical observation period is complete. For example, China constructed

quarantine, treatment hospitals and cabin hospitals. On the other hand, mandatory administrative shutdown measures, such as lockdown and blocked traffic, were employed. South Korea delineated special infectious disease control regions for disease management and conducted extensive tests on congregation and other groups. Moreover, Singapore punished home segregators who violated quarantine measures.

The "flu pandemic-like strategy" focuses on patients with severe or underlying diseases, while home observation is performed for patients with mild disease. When necessary, social distancing measures are conducted to alleviate the medical burden. For example, the UK proposed a four-stage plan of contain, delay, research, and mitigate; Japan delayed many sports tournaments but did not stop manufacturing.

Thoughts on China's Epidemic Control Strategies

There are three advantages to China's epidemic control strategies. First, mandatory administrative measures were adopted to control the epidemic at the source, comprehensive detection and management of personnel were achieved, the situation of epidemic control improved, and the production and living order were restored at a faster pace. Second, fairness and nondiscrimination were important principles, and the government took responsibility for citizens' health and safety. Hence, all patients were treated. Third, all parties cooperated with the governance, and medical staff, social organizations, and volunteers actively took responsibility.

However, when we focus our attention on long-term mechanisms, we find some areas worth considering. First, China also adopted a variety of containment measures in areas without widespread community transmission, and the nationwide lockdown resulted in immense economic losses. In addition, traffic, materials, and other related support services generated a large amount of additional nonmedical transaction costs. Second, there is weak medical technology support. Estimating the incubation period is critical for addressing the COVID-19 epidemic [15]. Regarding disease warning, when China's epidemic had not occurred in mid-January, Imperial College, London predicted that there should be 1,700 infected individuals in China. With regard to patient screening and tracking, the USA can rapidly extract RNA and conduct screening within 15–20 min; however, China requires at least half an hour for this process. Third, epidemic control mechanisms lack an effective long-term plan. On March 22, 2020, the Evolutionary Ecology of Infectious Disease group at the University of Oxford published a study that rationally predicted the possibility that the epidemic will approach herd immunity levels, implying that some countries that employed herd immunity measures could lift travel bans after the epidemic is over. However, the use of "SARS-like epidemic control strategy" by China may delay the implementation of the exit strategy, resulting in a passive situation at the later stage.

Epidemic Control Recommendations

An analysis by the British Broadcasting Corporation revealed three future paths: vaccination, infection leading to a sufficient number of immune individuals, and permanent changes in behavior/society. All challenges related to COVID-19 must be recognized and addressed at the global level to ensure that rapid and effective response measures are taken [16].

First, medical technology should be strengthened. The government should increase its investment in medical technology. For example, in some developed countries, the (research and development) costs for life sciences account for 40–70% of the total science and technology expenditure per capita. In addition, scientists should be forward-thinking, seek facts and the truth. For example, the UK implemented a principal scientist system. Second, public health systems should be improved and integrated with clinical practice and prevention. Various regions should conduct epidemiological surveys for the healthy population using nucleic acid and serum antibody tests, determine the number of asymptomatic infections, scientifically evaluate the virus's patterns and epidemic trends, and maintain a sufficient level of vigilance against epidemic recurrence. Third, focus should be placed on the management of individual behaviors in public. Individuals must use rational attitude and behaviors to identify and avoid risk, adopt a healthy diet and lifestyle, and promote a balanced human–natural ecology relationship. Lastly, there should be compliance with the cost–benefit principle. According to the cost–benefit principle, secondary costs should not exceed the cost of the event [17]. China's short- and long-term economy have been hit hard by the outbreak, and it is vital to identify strategies that can be employed to ensure continuous economic growth.

Conclusion

Currently, the COVID-19 epidemic is still at the variation stage with no unified and standard epidemic control strategy. As next steps, countries should learn,

reference, and assist each other and explore universal and sustainable management strategies based on their national management systems.

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