

Is hard control always good? Why should countries adopt their policies timely? —— An comprehensive analysis of the impact of hard and soft control in the COVID-19

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Abstract: The world is still affected by COVID-19, and the number of infected people is still increasing. Although scientists have developed vaccines, more and more mutants have been discovered around the world. This makes the prevention and treatment of COVID-19 very difficult. In this paper, we discussed the policies adopted by countries that have adopted hard control policies in response to the COVID-19, such as China and New Zealand, and their contribution to the rapid containment of COVID-19. As well as the policies are taken by some countries that implement soft control policies, such as America, and their benefits to people who are experiencing this epidemic, including reducing psychological pressure, economic pressure, and protecting privacy. Finally, we also discussed that the countries actively adjust their policies according to the epidemic's development stage. For example, the United States is transitioning from soft control to hard control. We hoped that all countries could make timely adjustments and choose appropriate prevention and control policies by understanding the advantages and disadvantages of hard and soft controls.

1. Introduction

To date, there have been nearly 120 million confirmed cases of COVID-19 globally, including over 2.6 million deaths, and the number of newly reported cases is still increasing with over 400 thousand daily reported one, creating a great tragedy to the world [1]. This pandemic has negatively affected the growth of the economy and the order of social life. As long as pandemic suppression is the purpose, a severe economic downturn will be an unbreakable trend [2]. Some measures such as lockdown of theatres or forbidding unnecessary public gatherings will lower personal life quality. Apart from that, the disease burden related to it comes from the infection of COVID-19 itself and untreated chronic diseases [3], making the situation even worse. Moreover, we now lack a full understanding of the pathology of the COVID-19 virus. Scientists haven't confirmed all the transmission ways of this virus by now, while increasing numbers of mutants have been found worldwide, making prevention and treatment even more difficult. No optimal treatments have been found, and although vaccination is being promoted in lots of countries, the protection rate of it is uncertain, and some unexpected side effects have happened. As a result, COVID-19 will likely be part of our daily life and bring more waves in the future, just like what influenza does to human beings, which makes rapid response to possible future outbreaks much more important. At the early stage of this pandemic, different countries adopted different policies to deal with the outbreak varying between hard and soft control, containing the spread of this virus at different levels. With the development of COVID-19, many countries chose to adapt their policies for the changeable condition to better contain its continuous prevalence. By reviewing various studies of policies during COVID-

19, we first explore the policies for countries under hard control and analyze the successful reasons for these countries. After that, we further study soft control in some other countries and find its merits. Finally, we analyze varying policies during different periods of the pandemic in different countries. We found that both hard and soft control has advantages and disadvantages, which makes adaptation matters.

2. Analysis impact of hard and soft control

2.1 Successful policies under hard control

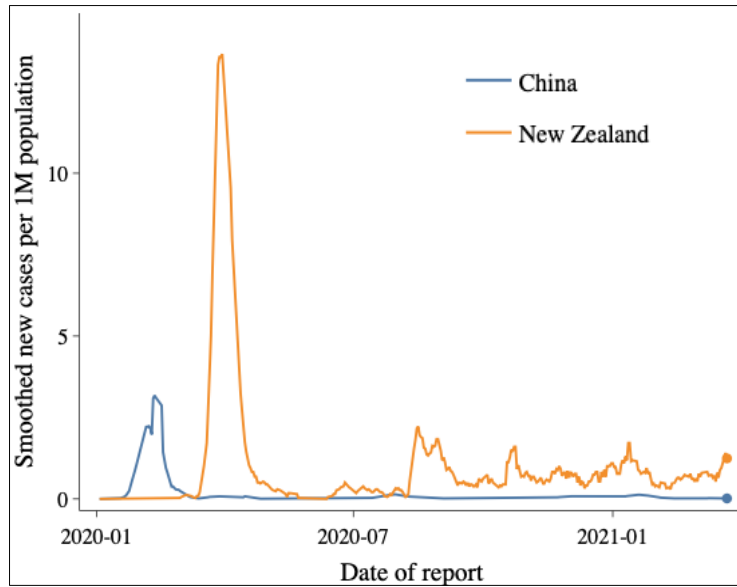


Figure 1. Number of cases and death according to date of the report in China and New Zealand (adapted from the website of the WHO [3])

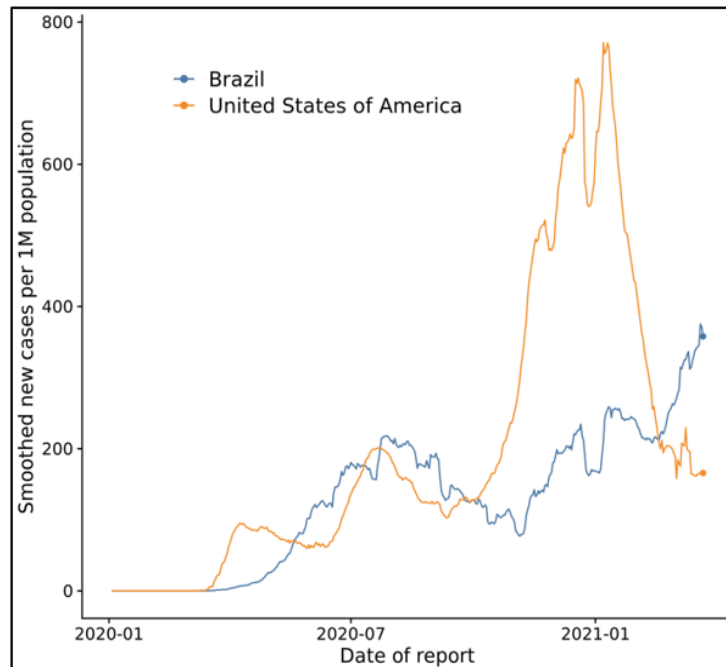


Figure 2. Number of cases and death according to date of the report in Brazil and US (adapted from the website of the WHO [3])

Considering the severe disease burden Covid-19 have brought to the human being, all the countries are positively dealing with the unexpected pandemic. Some countries took hard control of it, such as China and New Zealand, while others chose soft policy, such as Brazil and the US. From the curve

provided on the WHO website, two groups of countries are facing a different situation during this pandemic, with China and New Zealand containing it within 4 months while conditions are still worsening in both Brazil and the US. (Fig.1-2). Many praised New Zealand's Prime Minister Ardern's strong political leadership [1] and China's adjustment of macro policies in response to COVID-19, which is believed to play an important role in promoting stable and sustained growth of the economy [2]. Their success may come from the actions taken by the strong government, including restricting population flow, extensive testing, case tracking combining with quarantine, and health code policy.

2.1.1 Restricting population flow

Because travelers have become a central part in the dispersal of COVID-19[4], many countries have restricted population flow by banning people traveling in and between countries, delaying part of the spread of this tricky virus. For example, in China, learning from the experience of defending SARS, the government swiftly enforced a series of nationwide travel bans after realizing that the large-scale human mobility during the traditional New Year holiday helped COVID-19 spread into other provinces outside Wuhan in China. The travel bans started from Wuhan at 10 a.m. on January 23rd, 2020, and then the entire Hubei province a few days later [5]. And the ban in Wuhan didn't release until 0 a.m. on April 28th, 2020, when the defense against COVID-19 in China made great progress. A study suggests that without the travel ban, there could have been 744,000(\pm 156,000) confirmed COVID-19 cases outside Wuhan by February 19th, day 50 of the epidemic while with that the number would have been decreased to 202,000(\pm 10,000) [6], largely reducing the loss in China in this pandemic.

2.1.2 Extensive medical testing

The most commonly used medical testing is nucleic acid testing, which will detect patients infected with COVID-19 more rapidly. A retrospective study found that extensive medical testing could keep viral spreading at a low level [7], and due to extensive medical testing, lots of countries have succeeded in containing COVID-19 infection. In South Korea, thanks to its experience of MERS in 2015, the launch of developing a test kit was announced in mid-January [8] right after China submitted viral genome sequence information to WHO on January 12th [9], as a result of which mass medical testing began early in February not long after the first confirmed case on January 20th [8]. Under such measure, without lockdown, daily reported cases reduced sharply in South Korea from 800 to 50 with a rate of 0.21 daily test per 1000 people. Other countries which imposed the mass screening strategy witnessing the same inspiring results are shown in Table1[10]. The data implies the effectiveness of mass screening in containing this pandemic. However, extensive medical testing requires large amounts of personnel and kits thus can't be applied to all the countries. In some countries lack of medical instruments, targeted medical testing of the susceptible population should be imposed, which will be effective just the same as extensive one [10].

Table 1. COVID-19 testing capacity and result among countries [10]

Country	Testing capacity per 1000 people per day	Number of reduced cases per day
South Korea	0.21	750
China	0.51	15,089
Germany	0.64	5493
Iceland	0.21	99
Italy	0.46	6000

2.1.3 case tracking combining with quarantine

Backward and forward tracking of people infected and tracing their contacts interventions [11] have been adopted in various countries such as South Korea [8], China, and New Zealand [12], succeeding in containing the pandemic. For example, in South Korea, after realizing that lack of transparent information to the public contributed unnecessary spread of MERS in 2015, laws passed in South Korea allowing authorities to trace infected individuals; thus, the country was able to start

tracking patients and immediately after confirmation of COVID-19 outbreak saving more potential infected patients and avoiding people going to affected places [8]. However, a study in Taiwan found that tracking patients and their contacts alone wouldn't be sufficient while combining these with the 14-day quarantine of close contacts would reduce the reproduction number under case-based interventions from the counterfactual value of 2.50 to 1.25 (95%CI:1.22-1.28) [13]. This might explain why the more aggressive policy requiring contact people's self-isolation after tracking won much more success in China, helping it contain the pandemic within 4 months.

2.1.4 health code

The health code is an application activated during the COVID-19 outbreak in mainland China and used as a personal electronic pass. Applicants can automatically generate a code by filling in personal information, health status, travel history, place of residence, and whether they have been in contact with suspected or diagnosed pneumonia patients and other issues. The health code is divided into three colors: red, yellow, and green, and the personal epidemic risk level is dynamically displayed. Red means travel is prohibited, green means travel is allowed. A person can only enter and exit the public facilities when it expresses a green code. The new policy could help the community to detect timely patient's close contact and reduces the speed of the spread of the epidemic.

2.2 Advantages under soft control

However, The COVID-19 pandemic has brought many health problems to people and brought many inconveniences due to the lockdown. In the previous section, we mainly explained that hard control could control the epidemic's development better and faster than soft control, but this does not mean that hard control is completely superior to soft control. Hard control only considers the control of the epidemic from a macro perspective. Still, it does not consider the status of the people affected by the epidemic in the epidemic control policy. At this point, soft control will be more prominent because it will reduce people's psychological pressure, economic pressure and increase privacy protection.

2.2.1 Reducing the chance of suffering from psychological problems

Due to the extremely high transmission rate and incubation period of COVID, most countries have adopted hard control systems to control the development of epidemics and protect people's health problems such as lockdowns. Still, lockdowns can affect people's mental health. In a paper published by Antiporta, he found that pandemic control measures' strictness is closely related to people's mental health problems. They conducted a depression survey during the national confinement period in Peru (May 4-16, 2020). The results showed that: During the COVID-19 pandemic in Peru, the burden of depressive symptoms and psychosocial reactions has increased [14]. This means that if a country adopts strict control policies, such as strict restrictions on free movement, it may increase people's suffering from depression. So, what about soft controls? How does it affect people's psychological conditions?

Although soft control system cannot control the epidemic very well because people will not be required to be quarantined, it can give people more freedom. As suggested by F. P. C. Miskulin, for counties that take COVID-19 more seriously, due to social isolation, lack of daily activities, fear of contagion and death, and their citizens are easier to feel hopeless, lead to the development of depressive symptoms. The first-year university students are most affected [15]. Well, for countries with softer movement, people can do as usual since people do not need to be quarantined at home for 14 days. They could face-to-face communication with friends or colleagues. Because people can maintain contact with society, they will not get social isolation due to mandatory isolation, especially the impact on personal mental health, such as depression, anxiety, and negative psychological effects. Besides, because of the soft control policy, people will not be suddenly isolated at home due to mandatory isolation and lead a different life than usual. People can still choose to live, as usual, so people will not have psychological contradictions because when a person's life changes suddenly, it will cause some psychological contradictions. Finally, In a paper published by Khushboo Juneja and

other researchers, they conducted a cross-sectional online study and found when participants listening to the latest news about the virus, they felt frustrated (28.9%), changed their eating habits (50.7%), and had trouble falling asleep (35.1%) [16]. Because people will watch various negative news about the epidemic during the quarantine period, people who are quarantined at home will feel panic. Still, under the soft control policy, people can truly feel the impact of the epidemic on the outside world, so they will not be affected by some negative news. Therefore, in terms of mental health, soft control is better than hard control.

2.2.2 Relieve income problem

As the epidemic spreads worldwide, some countries have adopted hard control policies to ensure people's health and safety. Regardless of whether people have been in contact with patients infected with the COVID virus, they need to be isolated at home. Although this can slow the spread of epidemics, it will affect people's normal lives. Some people can convert their work to an online office without much impact, but some jobs will be greatly affected, such as restaurant employees. In a paper published by Stephen and other researchers, they found that the impact of Covid-19 has a serious impact on individuals, families, and societies' socio-economic structure. The epidemic has led to the closure of many factories, and many people are facing unemployment, and as the lockdown time increases, this impact has become more serious [17]. Therefore, some people may lose their jobs due to the isolation policy and have no economic income. Besides, people engaged in special jobs will not be able to work normally, affecting their economic income. However, people under the soft control strategy can choose freely. People can choose to protect themselves and stay at home or continue to work outside to maintain their financial resources. Therefore, regardless of whether they can turn their work into an online office, people can maintain their income.

2.2.3 Protecting the human right

To better control this epidemic, countries with stricter policies have adopted multiple methods to track people's activities on a daily basis, such as travel codes. Although it can help them better control the virus, it has raised concerns about privacy violations. The new strict policy can detect and show where people have gone in the past 14 days. Therefore, when there are zero patients in a certain area, medical staff can easily find zero patients through the new policy. Still, such a policy also has shortcomings, and it is difficult for people to protect their privacy. Earlier in China, the whereabouts of a 24-year-old newly positive patient was exposed for 14 days. It was originally used to better track possible contacts and prevent the spread of the epidemic. However, some people accused the girl of not staying at home and wandering around. Spread the disease, even though the girl did not know that she was positive at the time. Later, the girl got depression and tried to kill herself because she couldn't stand the online violence. This incident shows that itinerary tracking will undermine privacy and may lead to online violence. In addition, after China issued the "Health Code", some technicians conducted analysis and found that the system can not only determine whether someone is at risk of infection in real time but also provide information to public safety agencies to monitor their location and health, and reduce the user's personal information, location and identifiers are sent to the server (which may exist for a long time after the epidemic is over), and then help the government to monitor it. This is a problem caused by hard control. Compared with hard control, soft control is more humane, and it is more conducive for people to protect their rights. People don't have to worry about experiencing cyber violence just because they go out to relax, nor do they have to worry about discrimination after cure. People can better protect their rights.

2.3 Adopt different response methods at different times

2.3.1 Policies adopted by the United States in different periods

Under the influence of the high-speed movement of the global population, governments and medical systems of various countries are facing the public health crisis of the COVID-19. Different countries have their own response measures in the face of the COVID-19. As one of the countries most affected by the epidemic, the United States has different response methods at different times.

The initial phase

The inherent characteristics of the COVID-19 crisis across borders (wide and serious threats, urgency, and uncertainty) spread on an international scale, which requires flexibility to respond to changing circumstances. The United States was hindered in the early stages. The Trump administration failed to propose and promise a clear response concept. When the United States announced its first case on January 21st, although public health experts were fully aware of the actions required to respond to the COVID-19 outbreak [18]. But public health professionals call it "containment"[19]. The government did not seriously commit to containment goals and measures but evaded these goals and measures by positioning the problem as a foreign problem [20]. As a result, in early March, among U.S. residents in areas where the disease was recorded, multiple COVID-19 cases without travel history were found, which indicates that transmission within the community has occurred outside the hospital accommodation area. For public health professionals, this shows that containing the coronavirus is no longer a viable option.

Rigorous stage

Investigations of strains collected from northern California from early February to mid-March revealed that the strain was introduced multiple times due to international travel (from China and Europe). Sequencing of the strain collected in the New York metropolitan area in March also showed that it originated in other parts of Europe and the United States. During this period, return cruise passengers also contributed to the increase in numbers. People from many countries or regions kept close contact during the voyage, and the crew continued to make many voyages on the ship. As a result, passengers returning from the cruise ship contributed to the early acceleration phase. This has made the U.S. government's attitude toward covid-19 more rigorous [21]. Public health measures taken to reduce the continued import of the virus include travel restrictions on non-US citizens or permanent residents arriving from China from the beginning of February and later expanded to include other countries that continue to spread widely. The Travel Health Notice issued countries with known pandemic developments and issued warnings to ultimately avoid unnecessary international travel expenses and all cruise travel. Quarantine measures have been implemented for known international travelers (such as Hubei Province and the Diamond Princess cruise ship) who have known the locations and environments they have been in contact with. On January 17th, inspections and public health risk assessments of passengers at some US airports began. Follow these policies, and the local epidemic situation is stabilizing.

2.3.2 Policies adopted by China in different periods

It also took a lot of time in China, from the outbreak of covid-19 to the complete suppression.

The initial stage of the epidemic

In December 2019, multiple cases of "unexplained" pneumonia occurred in Wuhan City, Hubei Province. As of December 31st, 2019, the city had reported 41 cases of new coronary pneumonia. Local governments, the National Health Commission, and relevant scientific research institutions have all adopted measures. Corresponding strategies and measures have been implemented, mainly including on-site epidemiological investigations, large-scale killings, and detection of the virus's entire gene sequence. For example, on December 29th, 2019, Wuhan Center for Disease Control and Prevention launched on-site epidemiological investigations to retrospectively diagnose Cases, and close contacts will be issued with orders to close the Huanan Seafood Wholesale Market. They will be disinfected on a large scale.

Epidemic spreading stage

From January 21st to March 5th, 2020, there was an average of 1,783 newly confirmed cases per day, with a maximum of 15,152 and a minimum of 119 in a single day. In this regard, the state established a leading group for epidemic response, and the National Health Commission has established The National Expert Team for the Medical Treatment of covid-19. On January 23rd, Wuhan closed all passages from Han to the Han city and officially "closed the city". Simultaneously,

the Huoshenshan, Leishenshan, and Huanggang "Xiaotangshan" hospitals were opened to cope with the increasing number of new coronary pneumonia hospitals. Cases. Build a shelter hospital for the admission and treatment of mildly ill patients. These strategies have solved the problems of a large number of patients and the shortage of dedicated beds.

Stable stage of the epidemic

On March 5th, 2020, there were 143 new confirmed cases nationwide on the same day, which was the last day when the number of new cases exceeded 100 during the epidemic. After the number of new confirmed cases per day dropped to two digits, the situation of epidemic prevention and control has moved from a midpoint. The period turned into a low-level operation period. The number of newly confirmed cases in Hubei Province has been zero for several consecutive days. Wuhan's epidemic prevention and control situation has also undergone positive changes, achieving a stable epidemic situation [22]. This series of overall prevention and control strategies and measures have alleviated the shortage of medical supplies and the shortage of medical resources in the region, maximized the admission rate and cure rate, and reduced the mortality rate.

3. Conclusion

In this paper, we review both soft control and hard control have their advantages. Hard control only considers the control of the epidemic from a macro perspective. Still, it does not consider the conditions of people affected by the epidemic in the epidemic control policy. At this point, soft control will be more prominent because it will reduce people's psychological pressure, economic pressure and increase privacy protection, reducing the chance of suffering from psychological distress. The inherent characteristics of the COVID-19 crisis (broad and serious threats, urgency, and uncertainty) have spread internationally, which requires flexibility in responding to changing circumstances. Take the United States and China as examples. When facing COVID-19, the two countries have adopted their own methods to control the virus's spread. For example, China has used travel codes. It can help them better control the virus. However, there are cultural differences between various countries. The travel code method has aroused concern about privacy violations. It is very discouraged in countries such as the United States. Different medical structures and political structures make the results in different countries different. For example, the United States was hindered in the early days. The Trump administration failed to put forward and promised a clear concept of response. The government did not seriously commit to containment goals and measures but evaded these goals and measures by positioning the problem as a foreign issue. The global diversity of cultures makes different countries take different measures in the face of covid-19 protection. Therefore, there will be some uneasy factors in American society. The number of unemployed people in the United States will continue to grow for some time. The financial pressure on enterprises and households will continue to increase, and consumer demand will continue to be suppressed, severely hitting the tertiary industry's consumption drive, which accounts for more than 80% of GDP. American economy. Not only will a large number of families fall into bankruptcy or even be displaced, but the United States will likely fall into more serious financial turmoil due to the massive default of the most basic national debts such as mortgage loans, consumer loans, and credit card debt. This is not only not conducive to maintaining the stability of the basic social order but also producing a large number of patients who are unable to pay for the treatment of new coronary pneumonia or the phenomenon of directly abandoning treatment without a diagnosis prevail. In summary, the different ways different countries deal with covid-19 will affect their social influence and political structure.

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