

# The Research Progress and Practice Exploration of the Spread Period during COVID-19

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**Abstract.** The COVID-19 pandemic is a global health crisis that severely influences humanity and the well-being of the planet. Countries and international health organizations implemented distinct protocols during the spread period of COVID-19, in efforts to control the spread of the pandemic. Before protocols are implemented, risk communication occurs as a foremost connection between the pandemic and the public. Public efforts and attention are important factors in further establishing specific protocols for them to work successfully. After risk communication, protocols such as quarantine, isolation, contact tracing, and social distancing, are implemented to control the spread of COVID-19. Each protocol contains specific advantages but also certain shortcomings that can be improved with future research. All can harm the well-being of individuals in some particular way, which needs to be improved. The spread period takes in protocols generated by the efforts of multiple parties, in order to reach the ultimate goal of returning to normal life.

**Keywords:** Research Progress, Practice Exploration, Spread Period.

## 1. Introduction

In 2019, a new coronavirus was identified as the cause of a disease outbreak that originated in Wuhan, China. As a highly infectious and contagious disease, COVID-19 spread to almost everywhere around the world at an accelerating rate, leading to more than 620 million cases and 6.55 million deaths [1]. Given the thorough clearance of COVID-19 is still far within reach, it is hastily required that a long-term spread prevention system be found and made to worldwide consensus. The pandemic caused many problems and suffering for humankind. People still live in this world full of constant fear of another outbreak or lockdown, which will disturb their lives. In order to improve the status quo, governments and international health organizations had been working on implementing different measures to better control the pandemic.

This research paper demonstrates risk communication measures and control protocols implemented in the COVID-19 situation, analyzes the process of social distancing, and explains each of them explicitly with distinct case studies, which both critically take pages from historical pandemic prevention, while also examining measures under current applications.

## 2. Risk Communication and Report

Risk communication has the first and foremost connection between the pandemic and the wide public. The World Health Organization defines risk communication as a widely applied strategy confronting a public health crisis. It involves the real-time exchange of information, advice and opinions between experts or officials and people who face a threat (from a hazard) to their survival, health or economic or social wellbeing, and the ultimate goal is to lead the public make informed decisions, mitigate loss and take preventive and protective action beforehand. Under the current COVID-19 pandemic background, effective risk communication is the indispensable way to minimize jeopardy and limit disease transmission to the general public.

The three incorporators of a feasible risk communication triangle are risk assessments, risk managements, and actions/feedback to the risk. Assessments primarily rely on professional medical

practitioners and professionals, surveillance over statistical changes, case density and projections, and predicting the risk factor if certain actions are taken. After the risk is being assessed, a centralized institute is required to give out announcements, guidance and warning to rouse the general awareness of the public, and the institute is endowed with power to mandatorily pursue residents to obey pandemic policies. Examples include the National Health Commission of China, which branches down to small units of communities (China NHC). Records from small communities are reported upwards, while policies and measures are announced from the top agency to small units. The third incorporator stands for the public, including large numbers of population without comprehensive medical knowledge, and rely extensively on social media. Public aggregates in communities, schools, companies etc., while the connections were built by means of families, school classes, colleagues or social media groups. Information flows along the brims of the equilateral triangle system, and decision making is the result of the information exchanging process.

The principles for risk communication is rising public credibility in order to provide guidance to health crises. Considerable criteria include but are not limited to diversity, transparency and timeliness. Diversity, according to its literal interpretation, represents the range of a risk report system. The protocol from the WHO on risk communication on the 2022 Monkeypox outbreaks, action units cover children, pregnant females, males with homosexual activities, health workers and large activity organizers [2]. Diversity includes multiple behavioral objects leading to variable intended results, which maximizes vulnerable populations capable of taking reactions while the risk strikes, which is especially meaningful for the heterogeneous population in the US. The second priority is keeping the result honest and transparent. The US Centers for Disease Control and Protection reacting to the 2009 H1N1 pandemic made a clear public statement that at the pandemic's starting stage, the transmission pattern and pathogen vectors still required research and localization. Overall, the CDC participated in 14 congressional hearings, provided support in additional 12 hearings, analyzed over 40 briefings, 350 congressional inquiries and over 3 dozen of newsletters. The email and web-based update results were unfolded and open to the public and media report through the ongoing pandemic, in order to make rapid and precise medical decisions (CDC Archive). Thirdly, timeliness is also required in conducting risk communication. The ineffective risk communication at the early stage of COVID-19 outbreak in China, December 2019 caused significant public damage that was theoretically preventive. Overcomplexed case reporting process and public information lag wasted the golden hours of reaction and retreat of residents, and misdecision of the government attempting to push down public fear in social media also proved time consuming, as many cases appeared extensively as help-seeking claims on social media platforms such as Weibo. To recap, simplified reporting and up-to-date measures contribute to a desirable risk communication network [3].

COVID-19 pandemic struck in an era of public voices and complex information networks. Based on the three principles discussed above, it is concluded that risk communication has experienced improvements. Pandemic indicators such as the SARS-CoV2 are revealed from medical investigators to the public to raise awareness on potential outbreaks and daily hygenenity [4]. In addition, social media, including Twitter, Facebook and Reddit proliferate information flow at an unbelievable extent. A study conducted by Columbia University in 2021 suggests that governments and community agencies are important stakeholders in risk communication in social media, for example, media companies, healthcare organizations and youth education groups. The public follow the tendency to tailor the mindset of these stakeholders in mind, therefore further create a unified trend of information relating to COVID-19, including possible warnings and immunization services. However, researchers warned that rumors, false information and misperceptions can complex and jeopardize public views and form a solid "echo chamber". This is a potential shortcut of politicized and commercialized purposes to invade information flow and distort public health decisions, and based on investigations, information incongruity, insufficiency and immediacy is the most prevalent fallacy of social media risk communication [5]. Translating policies into action often has no clear guidance or reference case when an unprecedented pandemic strikes, therefore, the risk tolerance which does not indulge the

pandemic to harm human rights and normal life should be controlled following the principles of trust and rapidness.

Risk report and communication in a nutshell is the contract between scientific honesty and public credibility. The participation of public power in the pandemic context is a challenge as well as a surveillance and motivation to fix pitfalls.

### **3. Control Protocols**

#### **3.1. Contact Tracing, Quarantine, and Isolation**

Contact tracing is “the process for identifying everyone that has been in contact with someone who is tested positive for an infectious disease” [6]. This method is significant for discovering potential transmissions and outbreaks as soon as possible and alerting the community of those who had been in close contact with someone who tested positive for COVID-19. Numerous distinct tools can be used for contact tracing, including but not limited to digital applications, volunteer contact tracing programs, and humanitarian reports and publications. Digital applications are the widest-used tools for countries to do contact tracing. For example, the United Kingdom has the NHS COVID-19 app used for contact tracing. The app tracks the spread of the virus and provides alert features that help people manage risk and take appropriate actions [7]. Another example is the use of the Jian Kang Ma, or the Health Code, in China. The health code tracks people’s geo-locative movement to check whether one has been in high-risk areas or areas with an outbreak. It assigns a color-based code for everyone, and this code determines potential exposure risks and travel history for an individual. In 2020, the Health Code had been applied in more than 300 Chinese Cities and contained more than 900 million users [8]. Volunteer contact tracing programs are also implemented in certain countries, such as the United States. A prospective implementation study shows that an emergency volunteer contact tracing program did not reach the CDC, Center for Disease Control and Prevention, benchmarks for time and yield, largely due to difficulties in collecting the information needed. Therefore, those programs should improve the quality of their workforce, better integrate testing services, highlight positive social influences, and address racial and age-related disparities to increase their effectiveness [9]. As contact tracing is the seemingly most popular and currently best protocol for decreasing the risk of transmissions, some may then start to question the effectiveness of contact tracing. In fact, contact tracing is flexible enough to be applied to most infections. Contact tracing must first need to be implemented to identify unidentified pathogens or viruses for further treatment and quarantine to be effective. Although the contact tracing protocol itself may not always be effective, the protocol is effective in the case of the COVID-19 pandemic.

Quarantine is to restrict the activities of people who are exposed to a contagious disease, in this case, COVID-19, to see if they become sick with the disease (CDC). Back in history, quarantine had always been one of the most useful methods for stopping the spread of a contagious disease. Today it still exists as a protocol implemented by most countries. Take China as an example. With the outbreak of COVID-19 in 2019, countless quarantine policies have been implemented to control the pandemic. Under the strict enforcement of those policies, China was able to make substantial progress in controlling the outbreak. But the quarantine protocols also brought consequences. People suffered from emotional disturbance, anxiety, anger, confusion, depression, insomnia, somatic symptoms such as palpitations, difficulty breathing, and stigma. In addition, people with other chronic diseases experienced the difficulties of shortage of medicine, equipment, and human resources. In response to those psychological consequences, psychiatrists and psychotherapists provided the government with advice on improving the measures from the aspect of mental health and humanity [10]. In general, the quarantine protocols in China do work as an effective measure for controlling the pandemic.

Isolation is to separate sick people with a contagious disease from people who are not sick (CDC). Its most explicit use is to prevent the disease from spreading to people who are not sick. Although isolation might seem similar to quarantine, they do have obvious differences. Individuals in quarantine do not have the disease while individuals in isolation do have the disease. Isolation protocols are

implemented by the government and carried out by communities and municipalities separately. Individuals can experience isolation in hospitals and at home, as long as the protocol can take place successfully. But in China, patients cannot be isolated at home, even if he/she is asymptomatic. “There remain risks if the so-called asymptomatic carriers are quarantined at home,” Wu Zunyou, chief epidemiologist at the Chinese Center for Disease Control and Prevention [11].

Since quarantine and isolation protocols are largely interconnected, many aspects of their implementation can be discussed together. An important aspect of those protocols is their costs. Using a 2021 model of Massachusetts, the study finds that successful support will be an average cost of \$430 per person, taking individuals’ salaries, necessities, and social service counseling into consideration. Additionally, each COVID-19 case requires about \$2500 per person in medical care expenses [12]. From those statistics, it can be inferred that quarantine and isolation protocols are very costly, so governments need to take into consideration the impacts of those measures on the economy. During the pandemic, countries like China experienced a decline in the economy due to long-term quarantine and lockdowns of massive groups of people. Currently, as conditions are better than before, Chinese cities are working to revive the economy and production of materials. Another significant aspect of those protocols that need to be evaluated is their effectiveness. Studies show that the trend of the pandemic depends on quarantined and suspected cases. This demonstrates that quarantine does work to control the trend of the pandemic since the numbers for different cases all increase exponentially at a similar rate.

The three protocols work as a step-by-step process. Starting from contact tracing and testing for the virus, then to quarantine and isolation measures for controlling the pandemic. Real-life models help researchers better identify policies that need to be improved and governments to better measure the effectiveness of protocols. The implementation of all three of the protocols is established by the government, enhanced by scientific research, and enforced by separated communities.

In general, contact tracing, quarantine, and isolation protocols are important measures taken into use by countries all over the world but yet remain measures that need to be improved. Governmental and global health organizations are still working on improving protocols for controlling the COVID-19 pandemic today.

### 3.2. Social distancing

Another protocol recognized by a large majority of countries around the world is social distancing. According to the CDC, social distancing is to remain out of places with a dense population, avoid mass gatherings, and maintain a distance of two meters or six feet from others if possible. Social distancing is effective since it can directly reduce the transmission of droplets between individuals, which is the commonly known way how the COVID-19 virus is spread. Droplets from coughing, sneezing or speaking travel a certain distance. By keeping this distance, people can reduce the spread of the virus. Wearing masks, washing hands, and disinfecting using alcohol are other methods of social distancing that can be used to control the pace and intensity of the pandemic. On a broader scale, individual actions contribute together to create changes, just as Caitlin Rivers says, “individual behavior changes are even more important. Individual actions are humble but powerful” [13].

The COVID-19 pandemic had been requiring huge supplies of medical resources around the world, either used for prevention, protection, or research. Since social distancing can decrease the spread of the virus, it can help decrease the medical resources needed, therefore also decreasing the cost that countries need to spend on resources such as masks and hand sanitizers. This saves money that can be used on further research and the invention of vaccines.

Governments around the world have issued policies and guidelines to increase social distancing within and between countries. Take the implementation in Korea as an example. As one of the most significant national protocols implemented during the pandemic, social distancing is constantly emphasized throughout the period. Workplace sanitation and social distancing were implemented and enforced once the first case was detected. The workplace distancing policy in Korea is revised based on the condition at a particular period. There are five sectors in the guidelines: operating highly

adaptive working systems, reducing business meetings and travels, monitoring cases, managing space, and doing disinfection. Overall, the results prove to be positive. The infection rate is controlled and slowed down. [14]

While social distancing measures minimize the spread of the virus, they have significant costs to society. Many events and meetings are canceled or transferred online to follow social distancing measures. What could be earned in those events is now lost. An economic forecast predicts that the United States' gross domestic product (GDP) will shrink by 6.2% in 2020, due to the combined effects of mortality, morbidity, social distancing, and other productivity factors [15]. As time goes on, direct economic benefits become more specific to households and firms, so people start to think about whether the cost brought by protocols such as social distancing is worth the cost. The results show that the economic benefits of lives saved with the support of those protocols outweigh the losses.

The cost of social distancing also includes mental health and overall life expectations. Alternation in social activities and communication due to physical barrier have created impact to ways of relieving emotions, including family gathering, aggregational events and outdoor activities. Besides, limited access to certain living facilities and workplaces, including the service and culinary industry, schools and hospitals have forced people to implement a new set of lifestyles under the shade of social quarantining, increasing the likeliness of anxiety, depression, hatred and violence due to the sharp turning in life.

During the early extensive quarantining period, pandemic-affected people of a wide age spectrum have experienced mental health fluctuation to different extents. The investigation on Chinese school-aged children switching their schoolwork to online platforms in response to social distancing and regional quarantining shows that children prone to have a disrupted diet and sleeping routine, with a higher rate of unstable physical state and negative emotions as a result. Causes of mental stress mainly come from fear of infection and lacking food or family income, failure to concentrating on class instructions without teacher surveillance, and lack of personal space at home without communicating with peers at the same age. Same anxiety also project to their parents, with worries of financial conditions and the effect of online studying. For adults, influences to mental health mainly originate from economic and career pressure during the pandemic. [16] In the US, adolescents showed higher suicidal motivations and depressive symptoms after enclosing themselves at home and away from other people due to fear of infection and judgement from other people. [17] However, other researches show that family confining and social distancing actually made out opportunities of relieving mental pressure during the quarantine, with evidence of lower social media usage, partying and increasing interactions between family members. Also, family members can bear closer bonds while staying relatively "alone as a team" in the state of extensive quarantining. [18]

To recap, social distancing as an important executive measure of limiting the spread of COVID-19 is increasingly being implemented worldwide. An optimistic foresight is that people are making an effort to minimize the loss of changing lifestyle and social productivity, aiming to reach a balance between effective disease control and relatively energetic social environment, instead of abandoning sustainability for expedient decrease of case numbers in this prolonged war against COVID-19.

#### 4. Conclusion

In conclusion, COVID-19 struck as an unprecedented global health crisis, while the potentially controllable nature ignites hope of implementing effective measure, tracing its expansion and construct a live pattern. Various data and epidemiology models have provided criteria of evaluating the effectiveness of processes during the spread period, taking efforts both socially and scientifically. Risk communication, contact tracing and physical/geographical quarantining represent the progressive stages of controlling the pandemic from the fundamental basis, requiring efforts from social media and public, modern biomedical practitioners and policy makers. It is a long-thought step to seek the consensus and cooperation of the three stakeholders involved, considering the temporary long-term coexistence of the human world with the pandemic, in order to minimize the impact on daily life and

loss of industrial productivity. The spread period of COVID-19 is decisive to the acceleration of returning to normal life, and further research is expected to find combinational preventive measures and adherence to appropriate disease control policies.

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