SOUTH KOREA: THE IMPACT OF THE GENERAL POPULATION ON A PANDEMIC

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INTRODUCTION

In December of 2019, when the novel coronavirus SARS-CoV-2 was identified in Wuhan, China, it concerned few people. But as the weeks passed, the virus and its disease—COVID-19—spread throughout the world, leading to a worldwide health, social, and economic crisis and essentially resulting in a global lockdown. Some countries, however, were able to circumvent a severe lockdown while quickly bringing the outbreak under control. One such country is South Korea, which, despite being one of the first countries to be affected by the coronavirus, has relatively low infection rates per capita.

South Korea's relative success in controlling COVID-19 partly resulted from the valuable lessons it had learned from its 2015 MERS outbreak, during which ineffective control led to widespread panic. After the MERS outbreak, the government reformed their healthcare and legal systems, giving them an advantage at the very start of the COVID-19 pandemic.

Just as it was quick to respond to the issues brought to light by the MERS outbreak, the government was quick to respond in mitigating COVID-19, releasing preventive guidelines to the public as well as implementing large-scale testing and in-depth contact tracing, all while staying conscious of and acting to minimize the economic impact. Meanwhile, on the treatment front, the government quickly intervened to ensure the fair distribution of hospital resources. Additionally, it supported the research and development of new drugs and vaccines to combat the virus.

But if we simply attribute a country's successful control of the pandemic to past lessons learned or an effective government, the average reader from a less successful country will be struck with a sense of powerlessness; they cannot, after all, change the past or reform a broken government in a day. This powerlessness, however, may be illusory.

Countries are not just their history and government. Above all, countries are forged by the actions of the average people. Government mandates and past events mean nothing if the general population, the real power behind a country, does not respond accordingly. Thus, our analysis of South Korea's success focuses on what lies within the power of the everyday person: the role that *they* play during a pandemic.

INFECTIONS AND FATALITY RATES

On January 20, South Korea reported its first coronavirus case, imported from Wuhan, China.[1] For almost a month, cases remained sporadic, limited mainly to travelers who had contracted COVID-19 outside of the country. However, in February, a member of the Shincheonji Church of Jesus inadvertently exposed hundreds of others to the virus while attending a church service in Daegu, which soon became one of the epicenters of COVID-19.[2] This superspreader event led to an exponential increase in cases in South Korea, skyrocketing after February 19 and peaking on February 29 with 909 daily confirmed cases.[3] Afterwards, cases gradually began trending downwards. In March, daily cases remained in the 100s, but by late April, they were consistently below 10.[3] This is mostly credited to thorough government guidelines and mitigation efforts established in response to the Daegu outbreak.

Following a holiday weekend in early May and the relaxation of social distancing, cases began rising again, this time in cities like Seoul that had not yet been drastically affected by the virus. Throughout May and June, cases

increased but generally remained around 50 to 60 per day. [3] This slight resurgence belonged to a second wave of infections, as confirmed by the Korea Centers for Disease Control and Prevention (KCDC) on June 22. [4]

Cases continued to fluctuate throughout July, with a brief spike on the 25th with 113 cases—the highest number since 190 on April 2. However, this was an anticipated spike, mainly due to international arrivals; the majority of these cases came from cargo-ship crew members and South Korean construction workers arriving from Iraq. [5] From late July to most of August, cases hovered around 20 to 40, and it seemed as though South Korea had managed to keep cases down at a manageable level.

However, South Korea is now experiencing a new surge in cases. Ever since anti-government rallies were held on August 15, cases have reached a level not seen since March. Many worry that the country has entered a new stage of rising infections that it may not be able to control. [6]

While South Korea's number of daily confirmed cases have previously remained low, new developments make it unclear whether the country will be able to control its new level of infections. Daily confirmed deaths have never been higher than 9, suggesting that, for now, South Korea has been able to successfully treat their COVID-19 patients and prevent hospitals from becoming overwhelmed. As of September 1, South Korea has had 20,182 total confirmed cases and 324 total deaths. [3]

As it is impossible to accurately identify every infection that occurs, a country's actual number of COVID-19 cases are certain to be higher than its confirmed cases; however, South Korea's reported numbers are likely only minimally greater due to its easily accessible testing. Of those tested, only 1.8% test positive as of September 1, [3] indicating that a large amount of the population is being tested, as opposed to just symptomatic people.

Some things to consider when assessing infection and fatality rates are possible risk factors and comorbidities for COVID-19, as well as the average age and health of the general population.

According to the World Health Organization, South Korea is one of the healthiest countries in Asia, not to mention the world. [7] In general, South Korean citizens live very healthy lifestyles, evident in its high life expectancy of 82.6 (in fact, the highest in the world as of 2020). The general population's high level of health can be attributed to a traditional Asian diet, a high level of childhood and adolescent nutrition, expanded access to quality healthcare, and frequent use of preventive care. [8-10]

However, South Koreans are not exempt from COVID-19 risk factors. South Korea's high life expectancy and low birth rates have led to a highly aged population; as of 2020, 15.92% of the population is older than 65. [11] In addition, levels of physical activity have decreased considerably in South Korea over the past 20 years. In 2005, 71.1% of males and 66.1% of females were physically active; by 2012, this had decreased to 66.1% of males and 43.1% of females. [7] As of 2016, the prevalence of diabetes is 14.4% among those ages 30 or older and 29.8% among those 65 or older. [12] The number of people diagnosed with HIV has been increasing over the years, reaching 1,222 in 2019. [13] As of 2018, a notable 1.46% of the population suffer from prevalent cases of cancer over a five-year period. [14] The smoking rate in 2019 was 37.2% for male adults. The female rate was recorded at 5.2%, but may be higher in reality; women, who are discouraged from smoking, may not admit to it. [15] Smoking has a great chance of leading to lung disease. Lung disease, diabetes, HIV, and other chronic diseases are all COVID-19 risk factors, as well as being 65 or older, leading a sedentary lifestyle, and undergoing treatment for cancer.

South Korean citizens are generally healthier than the average populations of other developed nations, which may have contributed to South Korea's lower fatality rates during the pandemic. However, its large elderly population and a high number of those with noncommunicable diseases suggest that, if not for the actions of the general population, South Korea could have suffered from a much higher mortality rate. The data suggest that

the people's compliance with government guidelines was just as important as overall health in keeping the country's fatality rates low. With many people at risk, citizens may have taken extra precautions to protect themselves and their loved ones.

Although the majority of citizens have been compliant with government guidelines and mitigation efforts, a significant minority have not. Consider the February outbreak in Daegu, during which South Korea experienced a sharp spike in cases linked to members of the Shincheonji Church of Jesus. As of September 1, 25.8% of total COVID-19 cases are connected to the Shincheonji cluster. [16]

Many South Koreans blame noncompliant members of Shincheonji, and what many call Shincheonji's shady practices, as the main cause of the outbreak. For example, many have criticized Shincheonji for kneeling and praying in close quarters, disapproving the use of masks during services, treating sickness as a sin, and prioritizing proselytization over physical health. [17]

Shrouded in secrecy, Shincheonji has long been perceived as a cult due to its strange and "heretic" beliefs. [18] Accordingly, most members tend to hide their affiliation with the church, even from their family, justifying their secrecy in the name of God. [17] Shincheonji's connection to COVID-19 has only worsened its social stigma, making people even more reluctant to admit they are members, likely for fear of public retaliation. [17,19] As a result of the February outbreak, thousands of Shincheonji members have faced mistreatment and discrimination. [20] There have been multiple reported cases of harassment and abuse, two even leading to death. [17,19] It is easy to see why many Shincheonji adherents refuse to reveal their membership, let alone undergo testing and contact tracing: out of fear their basic rights will be violated.

Shincheonji claims to have around 240,000 members, but their exact numbers are unknown. [17] This uncertainty obfuscated public health officials' efforts to find and test all Shincheonji members, intensifying public ire against the organization. [17,18] Over a million people signed a petition calling for Shincheonji to be dissolved. Many, including the mayor of Seoul, called to have Shincheonji's leader, Lee Man-hee, arrested for obstructing public health efforts. [18] This effort was eventually successful, and he was arrested in early August. [21]

More recently, the current August outbreak in Seoul has been linked to anti-government protests made up mainly of members of the ultra-conservative Sarang Jeil Church. Reverend Jun Kwang-hoon, chief pastor of Sarang Jeil, spoke at multiple anti-government rallies involving thousands around August 15, many of them attended by Sarang Jeil members who, like Rev. Jun, were supposed to be in quarantine. [22]

In addition to being distrustful of the government, Sarang Jeil protesters believe that the progressive President Moon is leading their country towards "quarantine communism." They accuse Moon of trying to take away their religious freedom. [23,24] Rev. Jun, a leader of the ultra-conservative religious faction, has compared President Moon to dictators like Adolf Hitler and made dubious claims, like "they [presumably North Korean terrorists] poured the virus on our church." [25]

South Korea is well known for its political activism, especially in Seoul, and large protests are common. [26] However, these protests make it difficult to enforce mask and social distancing guidelines, especially when those like Rev. Jun are skeptical of the Moon-led government and refuse to cooperate with it. [22] During a pandemic, attending large gatherings is dangerous by itself, but choices like not wearing masks or complying with quarantine measures only compound the risk of spreading the virus (not to mention spreading falsehoods in a position of high influence).

In addition, many members may believe that faith is enough to combat diseases, that the pandemic is "fake news" spread by the government, and that taking preventive measures shows a lack of faith in God. [22] Hundreds of Sarang Jeil members, including Rev. Jun, have tested positive for the virus. [22,24]

In response to the high number of positive cases stemming from Sarang Jeil, some members assert that the government has falsified positive test reports to suppress them and crack down on protests.[25] Many have refused to be tested.[22] Sarang Jeil's members are, on average, older and thus more at risk for the virus than members of Shincheonji, so this outbreak may prove to be deadlier than the one in February. In addition, this outbreak is centered around Seoul, the second largest metropolitan area in the world with a population density twice that of New York City.[27] Seoul's size and prominence as South Korea's capital means it has the potential to become a potent viral hot spot.

It is important to note that this does not go for all Sarang Jeil members, nor all members of the South Korean religious community. Despite a fringe minority, most people, regardless of religion, have obeyed government mandates. Although the government and other organizations (like churches) no doubt play a large role in preventing or allowing an outbreak to occur, it is clear that the general population is the most important force driving infection and fatality rates. Their decisions—whether to prioritize their health and safety or disregard government suggestions—are what will ultimately shape the course of the pandemic.

MITIGATION AND SUPPRESSION EFFORTS

South Korea's response to COVID-19 was immediate. Travelers from Wuhan were subjected to a health questionnaire starting January 21, one day after the discovery of the first case, escalating to a full evaluation on the 28th. Other measures taken by the government in late January include increasing its call center capacity, adding airport quarantine staff, and allocating its epidemic prevention budget.[28] As the situation grew dire, the country buckled down, kicking into gear some highly effective measures to suppress the spread of disease.

Since February, the KCDC has been releasing COVID-19 guidelines to the public. Social distancing has been advised in all iterations of these guidelines; however, the situation is evolving, with strictness levels fluctuating in response to the rate of new cases. At various points in February, the government suspended public services and delayed the start of schools.[28] On March 22, a 15-day strengthened social distancing campaign was established and, despite being effective due to active citizen participation, was extended past 15 days on account of the pandemic's severity.[29,30] In early May, more relaxed guidelines for "distancing in daily life" were adopted.[31] In late June, the government adopted a three-level system to classify the intensity of social distancing guidelines, and the country as a whole stayed at the lowest level for much of the summer, although some local governments increased their city's level.[32]

In contrast to the dynamic social distancing situation, some measures have stayed constant throughout all the KCDC's guidelines, including hand-washing, cough etiquette, staying home if symptomatic, and wearing masks. Of 973 Koreans surveyed in late February, 67.8% claimed to always practice hand hygiene and 63.2% to always wear masks outside.[34] Given that this survey was conducted early on in the pandemic, these numbers suggest that the majority of people were quickly willing to adopt the necessary measures to reduce viral transmission. This quick response was critical in minimizing the number of cases; epidemiological modelling estimates that a delay just one week longer in reducing the transmission rate would have resulted in a peak of 30,000 active infected cases (without the delay, the modeled peak was 8,000).[34]

Even with the significance of the aforementioned preventive measures, an analysis of South Korea's mitigation efforts would be deficient without its world-renowned testing and tracing.

As early as January 27, health officials called upon medical companies to develop COVID-19 tests. The government offered fast regulatory approval for these diagnostic test kits, enabling their rapid production and use.[35] To use this large number of tests most effectively, drive-through testing stations were established. These

stations allowed for minimal contact between patients and personnel and shortened testing to 10 minutes per person. One improvement to the initial container-based testing center was switching to tents, which were more affordable and let the patient stay in their car for the entire process. Further innovation can be found in the development of walk-through testing sites, which are particularly useful in densely populated urban centers. [36] In late March, the testing capacity was 20,000 people per day, and results arrived within six hours. [35]

The successful testing program laid the foundation for an intensive contact tracing system. Manual contact tracing by KCDC officials involves four stages: investigation, risk assessment, contact classification, and contact management. Investigation is carried out via interviewing patients to collect information about their movements. For risk assessment, if further collection of personal data is deemed necessary, information is obtained from medical records, GPS data, credit card transactions, and CCTV footage. Contacts are classified as either close or casual and managed accordingly; both types of contacts will have their symptoms tracked, and close contacts will be required to self-quarantine. [37] The self-quarantining and symptoms of potential patients are monitored through a voluntarily installed application. [36]

Rising COVID-19 cases led to the creation of the Epidemic Investigation Support System, which digitalizes data from credit card companies, telecommunications firms, and the National Police Agency to automate contact tracing. This allowed KCDC contact tracers to obtain their needed information faster. [38]

Contact tracing enables the disclosure of anonymized information about infected people through text message alerts to the public. Initially, sharing patients' travel routes was standard, and further information could be provided at the local government's discretion. Inadvertent oversharing of information sometimes led to the identification and consequent harassment of these patients, raising questions about privacy rights. [38] As a result, in mid-March, the government released new guidelines that disallowed sharing addresses, workplace names, or full travel paths; a patient's visited places are only disclosed if they could have infected others. [39]

Despite some people's vocalization of privacy issues, South Koreans are generally said to be more tolerant of personal data sharing, and public feedback suggests that most want more information from the government. [37,38] To understand this tolerance, we must first consider the 2015 Middle East respiratory syndrome coronavirus (MERS) outbreak in South Korea, during which the government had delays in testing, failed to track superspreaders of the virus, and withheld information from the public. These failures received great criticism from the public and led to a multitude of health and legal reforms, including the establishment of epidemic response mechanisms and amendments to the Infectious Disease Control and Prevention Act, the latter of which permits the current collection and sharing of personal data. [40]

The critical response to the MERS outbreak demonstrated that the public valued government transparency over privacy, and the government's according response to the COVID-19 pandemic has thus been accepted and trusted. It should be noted that the people played a role in obtaining this trustworthy government—the current government was elected in 2017 after nationwide calls for the previous president's impeachment. [40] This illustrates how, in a democratic environment, the public can elicit change through active political participation.

During the COVID-19 pandemic, the people's trust has led to compliance with the government's guidelines, testing, and tracing. This results in a positive feedback cycle wherein compliance results in effective control of the pandemic, which causes the people to view the government as more effective and trustworthy, leading to continued compliance. Fatigue is possible, but the government has taken steps to explain the importance of preventive measures, acknowledge the public's efforts, and encourage continued participation. [31]

The people weren't always so content with their government. In early February, South Korea's president said that the coronavirus would "disappear before long," resulting in public outrage and over a million signatures on a petition for his impeachment. [41] Juxtaposing this rocky beginning with the country's current success offers a

cheering implication: governments have the chance to enter the positive feedback cycle with their country regardless of past missteps. Perhaps, when governments fail, the people can be the first to take action; some South Koreans had already begun independently social distancing prior to government coordination. [35]

The government clearly has a key part in managing the pandemic, but the contributions of the people should not be overlooked. Excluding policies that border on authoritarianism, no number of guidelines implemented by a government are meaningful unless the citizens are willing to adhere to them. South Korea's case is noted for its high levels of cooperation, which has been credited to other factors aside from lessons learned from MERS and trust in the government.

One such factor is the social stigmatization of infection, apparent in the doxxing of and aggression towards infected people. A survey of 1,000 Koreans has shown that this social stigma is their greatest fear about the virus. [38] The fear of being subjected to this treatment could manifest as an increase in compliance with preventive behaviors. This sort of pressure, however, is not desirable. During a pandemic, the people have a choice between empathic or malignant behavior, and the former is unquestionably a better option. A more positive kind of pressure is descriptive norms; people are influenced by seeing compliant behavior around them.

Additionally, the public's overall cooperation with mitigation and suppression efforts have often been attributed to the country's culture, with Korean Confucianism and collectivism giving rise to individual sacrifices for the common good. [42] However, the idealistic view of South Korea as a harmonious society of prosocial values and obedience, especially in comparison to more individualistic western countries, creates a dangerous generalization bordering on benevolent prejudice. While culture is undeniably influential, it cannot serve as an all-encompassing justification for the behavior of over fifty million people. For those who wear masks even within their homes to protect their families, there are those who do not wear masks at all, resulting in their infection. [43] With South Korea's hotter summer weather, there have been 840 reported incidents of fights arising from people's refusal to wear masks. [44]

Dissenters in South Korea are perhaps best exemplified by the Sarang Jeil Church, whose disregard for mitigation guidelines and lack of cooperation with the government resulted in the new August surge in cases. The government has responded by banning large gatherings, raising social distancing to Level 2 in the Seoul Metropolitan Region, and reiterating preventive measures in a new "code of conduct" for public behavior. [45]

The effectiveness of the government's response and the increased testing, however, relies on the general population. Their compliance with mitigation and suppression efforts determined South Korea's initial success at handling the pandemic. The country's future is uncertain, but one thing is clear: it's in the people's hands.

ECONOMIC IMPACTS

South Korea's economy has blossomed ever since the election of President Moon Jae-In in 2017. President Moon introduced many infrastructure projects and trade connections with North Korea in order to reduce tensions between both countries. Now, South Korea has an industrialized, technologically advanced economy which is worth two trillion USD, primarily dependent on exports. [46]

Though South Korea did not put lockdowns into effect in response to the pandemic, it still experienced an economic recession due to the extreme drop in exports. Exports account for about 40% of South Korea's gross domestic product (GDP). [46] In January 2020, when the first case of COVID-19 was recorded in South Korea, the government put in place a number of trade restrictions that limited trade with China and Japan, South Korea's largest trading partners. Companies where South Korea makes up a large portion of production, such as

Hyundai Motors, have seen huge drops in sales and profits.[47] Such drops caused South Korean stocks to drop 4% in February, when South Korea raised COVID-19 alerts to the highest level.[48]

Along with the decrease in trade, the drop in travel and tourism to South Korea also caused the recession. 4.2% of South Korea's GDP comes from tourism.[49] The country's beautiful nature and rich culture all account for a huge pull in tourism from all around the world. However, since May, there has been a 70% drop in international tourism, and locally, South Koreans who want to go on vacations have chosen to pick isolated destinations and activities, damaging the businesses that would usually profit from their vacationing.[49]

Even though South Korea's exports and tourism industry have experienced a recession during the pandemic, the healthcare industry has been benefiting. Health care exports have increased by 27% since the beginning of the year.[49] These exports mainly go to smaller developing countries in the Middle East and Eastern Europe, which are in need of masks and personal protective equipment.[50] Another thriving industry is pharmaceutics, where companies have seen an increase in profits, such as Samsung Biologics, which has seen a 30% increase in profits.[49] But even with these industries benefiting from the pandemic, South Korea will most likely be unable to return to its former economic prowess without exporting to their larger trading partners such as China and Japan, which means that until these countries reduce the spread of COVID-19, the South Korea's economy will continue to be in recession.

President Moon has called on the citizens of South Korea to help prevent the spread of COVID-19 and economic burden. In one of his press releases, he mentioned possible venues through which the people can do their part during the pandemic, stressing the need to decrease South Korea's economic dependence on other countries like China and Japan.[51] Additionally, the president provided financial aid in order to thank South Koreans for their efforts in helping stop the pandemic. He handed out one million won, approximately 816 USD, to every four- person household that lived below the top 30% of earners.[52] This incentive encouraged South Koreans to continue following government guidelines to mitigate the pandemic. Another incentive from the South Korean government was care packages that were delivered to those who were willing to follow stay at home guidelines. Along with masks and hand sanitizer, these care packages come with fruits and vegetables to make sure citizens are staying healthy.[53] These packages give South Koreans one less reason to need to leave their homes and make them more willing to self isolate.

As a result of the economic recession, the South Korean government has revealed a "New Deal," a plan to reshape the economy. South Korea's New Deal mainly focuses on providing jobs to decrease the unemployment rate, which has risen to 4.2% during the pandemic. With the New Deal, South Korea is hoping to not only reestablish their economic stability, but to lead the global economy.[54] Artificial intelligence, 5G wireless networks, and eco-friendly technology are all being brought to the least developed parts of South Korea in order to further industrialize them.[54] In doing so, the South Korean government hopes more job opportunities will open for South Koreans.

By encouraging South Koreans to play their part and rewarding them for doing so, the government was able to reduce the amount of COVID-19 cases with no need for a shutdown. However, South Korea still suffered an economic recession due to a decrease in trade and tourism, but now, new plans to restructure the economy are beginning in order for South Korea's economy to return to its former glory.

HOSPITAL RESOURCE USE

In January and early February, when cases were sporadic and easily controlled, South Korean hospitals hospitalized all COVID-19 patients, regardless of their symptoms, in an attempt to prevent the virus from spreading. This resembled the isolation standards inherited from the 2015 MERS crisis. However, following the

mid-February spike in cases, hospitals were overwhelmed in epicenters like Daegu, causing a bed shortage crisis, with over 2,000 patients waiting for hospital beds by early March. [55,56] High-risk patients and those with severe symptoms waiting for hospitalization died at home, leading to a brief increase in fatality rates in March, spiking on March 20 and 23 with nine daily deaths. [3]

As a result, the Daegu Medical Association established a triage system to prioritize the patients needing the most care, classifying COVID-19 cases into four categories: mild, moderate, severe, and extremely severe. This was adopted by the federal government and implemented across the country. [56]

The government transformed private dormitories and institutions into isolation facilities called living treatment centers (also known as community treatment centers), which they used to house people with mild cases who did not isolate at home. [57,58] This allowed hospitals to allocate their resources to those with greater need: the moderate, severe, and extremely severe cases. Severe and extremely severe cases were sent to tertiary hospitals with greater treatment capacities. Regardless of their symptoms, high-risk groups, such as the elderly and those with certain underlying health conditions, are classified as severe cases. [58]

Over 300 hospitals were designated as COVID-19 Protection Hospitals, which separated respiratory and non-respiratory patients so that the former would not spread the disease to the latter. [59] Anticipating a surge in cases, the government reserved more than 74 hospitals and 7,500 beds for COVID-19 patients, gradually reducing the amount of beds as the country's daily confirmed cases decreased. [60] Patient transfers due to changes in the level of care needed were handled by the Patient Management Task Force at the local level, while transfers due to bed shortages were handled by a branch of the National Medical Center. [59]

Health care workers from around the country were recruited and dispatched to areas needing them most, such as Daegu. [60] Many of the protocols for hospital resource use were implemented primarily to prevent the infection of health care workers, such as the method of allocation of negative-pressure rooms, which keep the virus from circulating through the hospital air. [59]

The government has encouraged the domestic production of personal protective equipment (PPE), intervened to secure these materials, and distributed them to health care institutions. [59,60] Though PPE was in supply, it wasn't abundant, cleading health care workers to reuse equipment like N95 respirators, goggles, and coveralls. [59]

When hospitals could not provide masks for all their patients, patients could easily obtain their own masks from convenience stores, due to South Korea's existing mask culture (caused by yellow dust, poor air quality, and past outbreaks of respiratory diseases). [37,59]

However, the people's mask purchases led to an unequal distribution of masks among the public. Additionally, South Koreans' dependence on masks led to panic buying when the first case of COVID-19 was recorded. This led to a mask shortage and an uproar from South Koreans who were fearful of catching the virus. They made violent threats outside of pharmacies and stores, which the government considered a mask crisis. [61]

The government combatted these issues in late February by buying 50% of all masks manufactured from South Korean companies and distributed the masks to pharmacies and stores. [61] This intervention helped the situation slightly, but other modifications were needed in order to keep up with the demand for masks. Soon, the government declared that 80% of masks manufactured in South Korea would be distributed to pharmacies and also put in place rationing rules such as 70% of all masks purchased would be sold at pharmacies and citizens could only buy two masks a week in hopes of easing the frenzy. [61]

Although it appears that South Korea's successful hospital resource use resulted from a close partnership between the health care department and all levels of government, the general population plays a subtle role here

as well. The public's acceptance of these strategies, from mask rationing to triaged care, was necessary for the measures to be viable. If the people had put up considerable protest—insisting their right to a hospital bed despite having mild symptoms, for example—officials would not have been able to implement their plans quite as easily as they did. Once implemented, the strategies played a notable part in the prevention of nosocomial infections and the successful treatment of COVID-19 patients.

TREATMENT AND VACCINE DEVELOPMENT

In response to COVID-19, South Korean companies have been developing new vaccines and treatments, including two vaccines called INO-4800 and GX-19. INO-4800 is a DNA vaccine created by the biotech company INOVIO; it contains the DNA of a spike protein found on the surface of the SARS-CoV-2 virus. [62] If the vaccine is effective, when the virus enters, the body will be able to recognize and create an immune response strong enough to combat it. [63] INO-4800 has three separate neutralization methods that test the vaccine's ability to block virus infection. These methods include inserting live SARS-CoV-2 virus to trigger antibodies and neutralize the infection, using a pseudovirus (where another virus displays the SARS-CoV-2 protein), and blocking spike binding proteins to the host ACE2 receptor. [62] Administration of the vaccine requires a device that uses electrical pulses to open pores in a cell (a method known as electroporation). [63]

INO-4800 is the first COVID-19 vaccine in clinical trials in South Korea. These trials are designed to test the safety, tolerability, and function of the INO-4800 vaccine. Trials will start with 40 healthy adults from the ages of 19-50 and then go on to test an additional 120 people from the ages of 19 to 64. Normally, this vaccine would take years to get approved for clinical trials, but due to the urgency of the pandemic, INO-4800 was fast-tracked and approved in just two months. For millions of South Korean citizens who have endured social distancing and its effects on their everyday life, this vaccine is a possible light at the end of the tunnel. [64]

Another vaccine being developed in South Korea is GX-19, the first vaccine to be approved by the country's Ministry of Food and Drug Safety. GX-19 was made by a South Korean pharmaceutical company called Genexine, one of the few companies supported by the South Korean government. Due to its approval from the government and public health offices, it is likely that the public will more readily accept this vaccine. GX-19 is currently going through clinical trials in South Korea. [65]

When a COVID-19 vaccine is developed, there are major obstacles to overcome. First, the vaccine must be effective—able to create enough antibodies in order to protect the body—but not so strong that it infects high risk patients with the virus in the vaccine. Second, the vaccine needs to undergo rigorous testing and clinical trials in order to identify any negative impacts. Vaccine development cannot be furthered beyond trials without volunteers from the general population, yet this is perhaps the most difficult stage of all; 86% of clinical trials are unable to recruit enough volunteers in time. [63]

Although researchers and scientists are rushing to create a suitable vaccine for COVID-19, some Korean parents hesitate on giving their kids vaccines. Some parents are worried about the negative and adverse effects vaccines might cause in their children because of rushed results. Another reason might be the lack of communication about the vaccination from scientists that might cause distrust in the vaccine.[66] One concern that can be concluded with this information about the new COVID-19 vaccines is that since the vaccines were rushed, they may cause more harm than good. An example of this is Sputnik, a vaccine created in Russia. This vaccine has not yet proven itself to be effective or reliable, since it has only been tested for less than 2 months.[67] Many people speculate that this vaccine is not safe for use or is not effective against the virus, since news about the safety of this vaccine might not even be true. This conveys that many people may not trust vaccines that are rushed and not proven safe.

Genexine has also been working on a treatment called GX-17, a drug able to slow down the progression of an illness and speed up recovery by increasing the amount of lymphocytes in a patient. A phase I study to test the efficacy of this drug is underway. [65]

In addition, the South Korean government has tested many already existing drugs in its fight against COVID-19. One of these options is remdesivir, an antiviral drug formulated to prevent various viruses from replicating.[68] The KCDC conducted a study with 27 different patients, all given remdesivir. The study found that 9 patients showed improved symptoms, 15 showed no change, and 3 exhibited worsened conditions; it concluded that remdesivir caused one in three patients to have improved conditions. Due to this, the South Korean government asked biotech companies for enough of the drug to be made to treat at least 5000 patients and be supplied all over the country.[69]

The country has also used dexamethasone, a corticosteroid that has anti-inflammatory and immunosuppressive effects. Since dexamethasone was fairly inexpensive and made in large supply in South Korea, it was largely used as a form of treatment. However, after numerous studies proved dexamethasone's ineffectiveness in less severe cases. South Korea released new treatment guidelines limiting its use to more severe cases. Dexamethasone also had many negative side effects, including hyperglycemia, glaucoma, and cataracts.[70]

South Korea also used a drug called hVSF v13 to treat coronavirus patients with pneumonia. There was a study conducted in which two patients received hVSF v13 as a treatment for their pneumonia. With the use of hVSF v13, the patients discovered their pneumonia disappeared after just 10 days of treatment with the drug.[71] The first of the two patients was a 81 year old man who for 12 days had been taking both lopinavir and ritonavir, both antiviral drugs, but he did not appear to be getting any better. He had to undergo mechanical ventilation and oxygenation. When hVSF v13 was administered, the man's conditions seemed to improve and on the 9th day, his fever diminished. On the 6th day, the virus was undetectable in the nasopharyngeal samples. The second man, aged 29, had an underlying condition. He had been on extensive lopinavir and ritonavir therapy, but his conditions worsened. After the first dose of hVSF v13, his fever subsided and on the fourth day, pulmonary infiltration decreased. On the sixth day, a decrease in inflammatory cytokines—a type of signaling molecule secreted from immune cells that can cause inflammation—was noticed. In this study, it was concluded that hVSF v13 decreased the viral load in both patients and also the levels of pro-inflammatory cytokines, and could hopefully be a drug more widely used in treating COVID-19.[72]

Following the major outbreak in Daegu, thousands of Shincheonji church members recovered from COVID-19, leaving many with antibodies to the virus. Encouraged by their leader, 4,000 of these members declared their intent to donate plasma, worth 83 billion USD. This was crucial for researchers because only 200 other recovered COVID-19 patients had been willing to donate blood; the Shincheonji plasma donations would enable further research and develop treatments. [73] As of late August, over 1,400 have followed through on donating plasma. [74] Being disliked among the South Korean population, the Shincheonji wanted to show their cooperation. Despite being hated by the general population of South Korea, Shincheonji was able to help the community with COVID-19. The donation of the plasma was received with gratitude and lessened the people's hatred towards the Shincheonji Church, but the members' reckless actions were not forgotten.

South Korea fought the virus with a multitude of pharmaceutical drugs. Through many hours of research, several clinical trials, and much needed public support, South Korea's pharmaceutical companies found treatments with the potential to combat COVID-19. The general population helped and can continue to help treatment and vaccination development efforts by participating in clinical trials, and the members of Shincheonji contributed by giving plasma donations to be used in research. There are still many obstacles to overcome with the vaccine, including its effectiveness and safety. Furthermore, there will be people who will not want to get the vaccine right away because of distrust and fear. However, South Korea's treatments have

aided many citizens suffering from COVID-19, and with the continued search for a new vaccine, the country is fighting off this virus with full force.

CONCLUSION

As shown in South Korea, the role of the general population weaves through every aspect of a pandemic. At times, this role is overt and intuitively recognizable; in other cases, it's subtle, even unexpected.

The clearest example of the public's impact lies in their simple decisions, whether that is prioritizing their health and safety or disregarding government suggestions. The choices will ultimately shape the course of the pandemic: whether the number of infections spike upwards or trend downwards.

Even a single person, like Sarang Jeil's leader Reverend Jun Kwang-hoon, can influence a small minority, and even a small minority that flouts preventive measures can make a disease much harder to control. During a pandemic, it is the responsibility of the people to adhere to preventive measures—self-imposed, in the absence of a coordinated government response—in order to mitigate the spread of disease, and they must not be led astray by those who refuse to fulfill such responsibilities. In doing so, the average person can become a positive leader for their community, effectively spreading good behavior instead of a dangerous virus.

These mitigation efforts will inescapably have a negative impact on the economy, but this impact can be minimized if the people are willing to still go out while following safety measures, as suggested by President Moon Jae-in. This balance between staying at home and reviving the economy will have to last until there is a solution to the virus, most likely in the form of a vaccine.

Once a COVID-19 vaccine is made, it will be up to the general population to choose to get vaccinated, which is vital in eradicating the virus. People play an important role in the development of treatments for COVID-19 by volunteering in clinical trials needed to test new drugs and methods. Without these brave pioneers, the development of new treatments would stagnate.

Above all, the role of the general population is to stay informed. This lessens susceptibility to the misinformation running rampant and highlights the importance of preventive measures. Additionally, being informed reduces the fear that might lead to self-imposed social isolation, which contributes to economic recession, or panic buying, which contributes to resource scarcity. Lastly, it leads to the discovery of unexpected methods to help with the fight against the pandemic and answer questions about the safety of vaccines.

This information will enable people to use good judgment and alter the trajectory of a pandemic for the better.

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