

Global Public Health Responses: Lessons Learned from the COVID-19 Pandemic between March 2020 and 2021

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Abstract Between March 2020 to March 2021, SARS-CoV-2 (COVID-19) exposed the readiness and reactivity of global healthcare systems. Analyzing various countries in each continent showed a delayed strict response to the novel respiratory virus had more considerable consequences with COVID-19 related cases, intensive care unit admissions and deaths than nations with strict and swift lockdown procedures. It is a stark reminder for countries to dedicate public health protocols and have unified government responses and supply chains that can quickly adapt to minimize damage to their citizens' social, economic, and physical health and well-being. This is already relevant with the rise of variant strains, particularly with the impact of the rising wave of the COVID-19 and its variants.

Keywords: COVID-19, lockdown, response, public health

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1. Introduction

The novel SARS-CoV-2 Coronavirus disease (COVID-19) from 2020 to current has significantly impacted healthcare systems and nations throughout the globe. Currently, at the near end of 2021, countries are still feeling the effects of COVID-19 related restrictions. The global public health response in Africa, Asia, Australia-Oceania, Europe, South America, and North America has highlighted the strengths and weaknesses of global preparedness and healthcare programs for answering pandemics. This paper examines key COVID-19 public health decisions from March 2020 to March 2021, analyzes economic, social and or political impacts and emphasizes effective strategies implemented by countries across the world in response to the COVID-19 pandemic.

2. Framework for Comparison

This paper will determine response levels by different continents, highlighting a few countries within each to exemplify strengths and weaknesses. A strong response will be defined as a faster response level with resulting few cases and a faster “return to normal life”. A weak response will be defined by the delayed response and/or a high number of cases. Key mitigating factors of countries' wealth and responses will be factored in to explain resulting case numbers and overall success.

3. Asia: China, Japan, Singapore, India

In the first-ever reports of the virus, 27 cases of pneumonia, later found to be COVID-19, were reported in Wuhan City, China, on December 31, 2019 [1]. The emergency preparedness and health strategies of the country were immediately put to the test. By February 1, 2020, China had to respond to a massive outbreak of COVID-19 with 14,380 cases and more than 300 deaths [2]. China's decision to initiate a lockdown in affected cities, such as Wuhan's 76-day lockdown, was crucial to limiting the spread of the virus even though the economy and healthcare system took a significant hit [3]. China implemented several strategies, such as their digital QR code-based system, which helped with tracing and isolation to identify possible cases of COVID-19 to ensure that those sick with the virus would have limited or no contact with anyone else [3]. These contact-tracing and isolation initiatives led to an effective containment of the virus. After several months of high case counts, China's cases had dropped significantly to 0 local cases by March 18, 2020 [4].

After most of the viruses in China, imported cases were the country's biggest struggle [3]. Despite this, China managed to contain the spread by implementing travel restrictions and banning most foreign visitors at the time and in as of March 2021 continued to maintain a low case count [5]. Japan was directly impacted at the beginning of the virus outbreak; however, it is believed that its existing

responses towards sanitation, healthcare, food habits and culture led to an initial flattening of the curve [6]. Since Japan's emergency law does not allow the government to call a lockdown, only requests to stay at home and limit social contact were enforced [6]. Japan also failed to limit travel effectively and continued to bring in cases from other countries. Despite this, Japan's general sanitary procedures and focus on healthcare flattened the initial curve and prevented several predicted death counts. Japan in March 2021 saw an increase in cases, with this wave being the highest yet and the country reporting 1,143 cases on March 22, 2021 [7]. South Asian countries stand more vulnerable to the pandemic due to their high population, poor infrastructure, and low surveillance system. On April 30, 2020, the South Asia region confirmed 54,021 cases with a death toll of 2088 [8]. India made history with initiating the largest lockdown; however, limited public compliance and a large informal workforce made it unsustainable. Limited sanitation system and testing infrastructure, little PPE and medical resources, a lack of testing, detection, and reporting in the region make it challenging to respond to COVID-19 [8]. Overall, the most effective strategy used in Asia is seen in Singapore, with a total case count (to date) of 60,196 and only 30 deaths [9]. Singapore saw their first COVID-19 case on January 23, 2020 [2] and did not hesitate to implement measures that would curb the spread of the virus. On January 31, 2020, Singapore had put a surveillance system into effect which would detect COVID-19 among three types of patients, extreme isolation, and a 14-day mandatory quarantine was in effect for all related and infected persons. Strict monitoring was done for those in mandatory quarantine, travel temperature, and health screening was also being done at airports [10]. By not taking the initial step lightly, Singapore was able to reduce its spread and limit its COVID-19 cases effectively.

From Asia, we can see the effectiveness of strict travel restrictions and monitoring. The high population makes it challenging to sustain quarantine. These countries are travel destinations for many, which makes it difficult but important for such travel restrictions to help limit cases coming in and aid internationally by containing cases within the country.

4. Africa: Egypt, Nigeria

The continent of Africa confirmed its first case of COVID-19 in Egypt on February 14, 2020, and February 27, 2020, in Nigeria [11]. Thus far, Africa has been moderately affected by COVID-19, with a spread to all 54 countries as of June 3, 2020 [12]. Due to the continent's history of lack of resources and weak healthcare system, it is predicted to be the most vulnerable continent where the spread of COVID-19 can have a major impact on the large immunocompromised population that have comorbidities due to malnutrition or other endemic diseases [11]. By March 2020, most countries had imposed travel bans and had instituted mandatory quarantine periods for most travellers, with states reporting fewer than 100 cases were imposing lockdowns and curfews, whereby April, 40 countries implemented early control measures and lockdowns such as closed borders and restrictions on

movements, public gatherings, and schools [13]. Though quick responses helped limit the spread of overwhelming COVID-19 related healthcare resource costs, Africa continues to face tremendous economic impacts. Many countries with already struggling economies are going into further financial crises and lack resources [11]. For many African countries, access to healthcare is a large gap that needs to be addressed. Significant issues include vulnerable communities that do not allow for social distancing due to large numbers of individuals living in close quarters, health facilities that tend to be overcrowded and understaffed, and the many rural areas that have limited access to care due to unreliable transport [14]. Outreach, case-finding, and containment for rural areas are essential in ensuring adequate controls [12]. In March 2021, the World Health Organization (WHO) reports 47 countries within Africa to be affected, with 2,957,425 cumulative cases and 75,748 deaths [15]. As of March 18, 2021, COVID-19 vaccination is underway, with 7 million doses administered; however, some countries are already exhausting initial supplies [16].

African countries have been using effective and innovative strategies to respond to the COVID-19 pandemic. Many countries were able to be prompt with these early control measures due to existing outbreak preparedness from disease outbreaks in the past. This offers extensive knowledge on disease analysis and program implementation. The benefits of previous initiatives to strengthen health systems because of other communicable diseases include an enhanced diagnostic and surveillance capacity [14]. Additionally, great strides fighting COVID-19 with innovative techniques, such as successfully sequencing genomes to track virus mutations, creation of rapid test kits, transport to densely populated areas using drones, deployment of robots for mass temperature screening to address a limited healthcare workforce and use of Geographic Information Systems (GIS) interactive maps to monitor hotspots [17]. Overall, early efforts on case detection and containment, increased testing centers, enhanced surveillance, contact tracing, and prioritization of domestic needs to produce key medical commodities [13] are helping vulnerable African countries avoid getting hit by COVID-19 harder.

5. Oceania: New Zealand, Australia, Fiji, Papua New Guinea

Oceania received its first case of COVID-19 on January 25 in Australia. Soon, subsequent cases were confirmed on February 28, 2020, in New Zealand, March 19/20, in Fiji and Papua New Guinea, and many smaller islands of Oceania have zero COVID-19 cases [18]. COVID-19 elimination strategies early successfully maintained the least number of cases and related deaths. Success for the other Pacific Commonwealth nations was due to their rapid response in closing borders or imposing high-level restrictions despite having no infected cases, which avoided large-scale public health threats [18]. New Zealand on the media has been acclaimed for their swift response and subsequent opening of the economy and ease of restrictions, as many other nations were in lockdown. The elimination strategy adopted by New Zealand and

other Oceanic countries helped avoid overwhelming healthcare systems, with intense level four lockdown announced on March 26 when there were no deaths and 100 cases in New Zealand [19]. However, such border closures, particularly on the tourism sector, had a substantial economic impact, particularly on islands in Oceania [18]. Challenges to overcome economic impact are stringent on opening borders, however, given the state of many other countries globally, this could result in the introduction and spread of cases to low cases countries. However, as highlighted by New Zealand and Australia, subsequent waves of cases were quashed due to effective quarantine policy response, the maintenance of contact tracing that has been employed since the start and isolation strategies mandated by health legislation [20]. Specifically, in New Zealand, effective communication of risk to the public and public compliance helped eliminate community transmission during the first wave [21]. As of March 2021, new cases have been introduced to parts of Oceania, most in Papua New Guinea with 738 cases, Australia with 76 and New Zealand with 24, however, 11 Pacific Island countries have not reported cases and five countries have not reported cases in the last week [22].

The benefit of early strict responses, seclusion, low population, and effective government communication can be highlighted by the countries of Oceania in tackling COVID-19. More stringent measures early on and communication throughout helped Oceania return to everyday life before the rest of the world, maintain low case counts and limit the exhaustion COVID-19 had on supply chains, health facilities and resources.

6. Europe: Italy, United Kingdom

Unlike other continents, Europe did not go into early control measures but rather at the beginning of the COVID-19 pandemic aimed to play a supportive role in having surveillance to define epidemiological and clinical characteristics of the novel virus [23]. By February 21, 2020, the virus that spread rapidly within China had spread to the European region in devastating numbers [23]. Within the first five weeks of cases, Italy already had 7372 cases with 366 deaths before it declared a strict national lockdown on March 9, 2020, the first European country to go into lockdown [24]. Following in March, Spain, the second most affected European country with 4231 cases, declared a state of emergency [24]. By April, many European countries, even though in lockdown, had an increase in cases, with Italy having double China's confirmed number cases and Spain overtaking Italy [24]. Mid-March, most European governments introduced legislative measures, while a few opted to promote voluntary practices to halt the spread instead [1]. Eastern European countries with more authoritarian governments were better equipped to adjust policies with implementations of lockdown coming from government rule to decree [1]. The United Kingdom was the main European country that delayed lockdown until March 23, 2020, causing an exponential increase in cases [24]. Also, in March, there was joint public procurement and stockpiling of personal protective equipment and medical equipment such as ventilators and research on treatments

and vaccines [25]. European countries faced significant impacts with collapsing supply chains, huge expenditures on healthcare and social protection, increased unemployment, and historical effects on the economy with steep losses in 2020 stock markets [1]. Initial European response has been criticized as being fragmented and poorly coordinated, with responses varying between health, political and economic imperatives and political messaging and timing [1]. Therefore, coordination, accurate and consistent messaging, robust containment, resource availability and educational initiatives [25] need to be addressed. March 2021 showed 42 out of 120 million cases are in this region alone, with new variants becoming more predominant [26]. Vaccination in March 2021 showed 3% of the population in 45 European countries was already fully vaccinated [26]. The tremendous impact the COVID-19 pandemic had on many European countries showed the ill effects of a slow and calm response.

7. Latin America: Brazil, Cuba

South America reported its first case of COVID-19 on February 25, 2020, in Brazil, and within weeks several South American countries enforced lockdowns and closed borders [27]. Over a quarter of all confirmed COVID-19 cases and a third of related deaths are from this region, with no signs of slowing down [28]. Many parts of Latin America have varying degrees of preparedness. Most, however, have endemic diseases that increase the risk of comorbidity with COVID-19 and fragile healthcare systems due to low economic status. Large income disparities and a significant proportion of the population living below the poverty line have poor access to a healthy diet, clean water, and health services [29] can exacerbate endemic diseases and COVID-19. In some areas, such as Brazil, favelas house a vast population where conditions are crowded and clean water access is limited, which makes COVID-19 interventions of social distancing and hand hygiene difficult, whereas, in Cuba, integrated healthcare systems [27] a large healthcare workforce, strict isolation measures and rigorous testing and tracing [28] can aid in preparedness for outbreak responses. Key challenges include a high obesity population that is at higher risk for severe symptoms. This large informal workforce cannot work from home [28]. In addition to the high population, South America has some of the most overcrowded prisons, which is a significant risk for spreading and contracting COVID-19. Still, countries are already reducing prison populations [27]. Political impacts have governments face considerable governance challenges because of excessive fragmentation built on distrust and constant change in officials and other economic impacts from healthcare, and social relief costs added onto existing precarious financial situations [30]. Increased trust between levels of government would help direct communication with local authorities, create local partnerships that would help deal with the pandemic, share resources, and help with the burden of cost [30]. As of March 2021, the Pan-America Health Organization (PAHO) reports that the Americas carry the highest burden of COVID-19 globally, with Brazil continuing to report the highest number of deaths and Argentina reporting high incidence and

positivity rates [31]. Vaccines through COVAX facilities have already arrived in Colombia, Peru and Paraguay, and strategic directions are being provided for countries pending the arrival of vaccines [31].

Latin America, like Asia and Africa, face many issues with comorbid diseases, lack of resources and high population. Cuba showed the most effective response, again due to strict early control and travel measures. Furthermore, a well-resourced and integrated healthcare system was an added benefit in tackling COVID-19.

8. North America: Canada and the United States

Lastly, North America had early outbreaks of COVID-19, particularly in the East Coast United States, British Columbia, Canada, and California, with the first confirmed case isolated in Washington State, United States, on January 15, 2020 [32]. After the introduction, large COVID-19 related spread and fatalities occurred, where by September 2020 that the United States suffered more than 190,000 fatalities and Canada with 9,200 deaths [33]. Overworked and exhausted frontline healthcare workers combated the influx of cases. North American countries adopted social distancing measures and hand-hygiene education programs, however lockdowns extent and duration varied from location [33], and border closures were delayed. Particularly affected were Long-Term Care Homes (LTC) that faced a brunt of COVID-19 related cases and deaths due to inadequate interventions placed by private LTCs, such as the enforcement of masks from visitors, lack of PPE, and a large vulnerable elderly population [34]. High level of partisan and public consensus over COVID-19 contrasted to intergovernmental divides in the United States [33] enforcement of social gatherings, socially distanced changes to public spaces, border closure, and quarantine measures helped Canada limit spread, as compared to the United States. Additionally, surveillance efforts, genomic and epidemiological analyses undergone by some locales helped mitigation measures for community transmission [32]. North America, like other nations, faced enormous economic impacts and supply chain crashes. Unemployment and seeking for social policy reimbursements were at an all-time high, with Canada providing bolder and faster social policy response compared to the United States [33]. Major challenges to responding to the pandemic stems from delayed relief response and blame and stigma, where the burden disproportionately affects health outcomes in minorities [35], as emphasized in large anti-racism protests that occurred last year. In March 2021, North America had a cumulative caseload of 2.6 million, with 757,300 cumulative deaths [31]. Vaccine distribution and programs are underway for North America, with 1.5 million doses administered in Ontario [36]. Though countries, such as North America, are showing success in vaccination rates, vaccine hesitancy was an issue throughout. Now at the end of 2021, there is a heightened resistance in anti-vax campaigns. Many companies have implemented stricter policies against those who chose not to get vaccinated.

9. The COVID-19 Pandemic Response and Future Epidemics

In conclusion, the COVID-19 pandemic has impacted every aspect of life globally, particularly from high number of fatalities, significant economic losses, and unemployment. The pandemic has highlighted strategies and the importance of quick responses and unequal distribution in healthcare access among continents and their countries. The analysis of a year with COVID-19 from March 2020 to March 2021 is not just to show the decimating effects of COVID-19 but to highlight weaknesses and strengths of different nations so that we can tackle COVID-19 and be better prepared for future epidemics.

The effective interventions were placed early on in Oceania, Cuba, and Singapore, in responding to COVID-19. Furthermore, reducing drastic cuts to healthcare helps with faster response, like in Cuba. At the end of it all, the total number of cases and the death toll was not just due to the severity of COVID-19, but due to overwhelmed healthcare facilities and lack of resources. Early interventions were vital to slowing down the COVID-19 pandemic and can be a strategy that can be used for any future epidemics. From what we learned, early control measures and learning from previous outbreaks allowed faster response, innovative technologies, and the importance of home-grown commodities. To implement early interventions quickly and effectively, governments need to be effectively communicating with their people. Communication helps individuals understand the potential consequences and severity epidemics have on day-to-day lives. To prepare for future pandemics and the impacts, governments should adopt effective strategies for communication and funding to help with public compliance and keep up with resources. A swift and unified political response is essential to adequately respond to the COVID-19 pandemic and future public health emergencies.

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