



RESEARCH ARTICLE

Assessing COVID-19 Outcomes in Light of Cultural Norms and Policy Changes: A Time-Series Analysis Tool Grounded in Safety-Focused Policy Science

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Correspondence: Yoshiyasu Takefuji (takefuji@keio.jp)**Received:** 13 June 2024 | **Revised:** 20 November 2024 | **Accepted:** 20 January 2025**Funding:** The author received no specific funding for this work.**Keywords:** border regulations | COVID-19 | test-isolation policy

ABSTRACT

Cultural norms and traditional behaviors have significantly influenced the outcomes of the COVID-19 pandemic. Asian countries initially outperformed their Western counterparts due to their cultural practices. However, policy shifts have led to a decline in these countries' performance. The objective of this study is to scrutinize the performance of different countries in managing the COVID-19 pandemic, with a focus on the influence of cultural norms and traditional behaviors, and to propose a tool that can inform and enhance current urban management policies. This study employs a time-series policy outcome analysis tool that operates on a single metric: the daily cumulative mortality of the population. By implementing a test-isolation strategy to manage quarantine periods, this tool aims to significantly influence the pandemic's outcome. The tool's efficacy is showcased through a case study involving four countries. New insights are validated and visualized via generated graphs, demonstrating the potential of this tool in the realm of tourism and urban management. This proposed tool holds promise for informing and enhancing current urban management policies, thereby mitigating unnecessary tourism-related fatalities in future pandemics. It underscores the importance of having the right information at the right time to make informed decisions in response to a pandemic.

1 | Introduction

This paper aims to analyze the impact of policy updates on educational safety during the COVID-19 pandemic. By examining daily death rates in four countries (South Korea, Japan, Taiwan, and New Zealand), the research seeks to understand how policy changes influenced COVID-19 outcomes. The findings can inform future policies on safety by demonstrating the importance of data-driven adjustments to minimize mortality rates. This knowledge will be particularly valuable for retrospective studies to improve pandemic management strategies and ensure lessons learned from COVID-19 are preserved for future preparedness.

The global and far-reaching effects of the COVID-19 pandemic have underscored the importance of policy sciences. These disciplines provide valuable insights into how scientific knowledge, emotions, and narratives can shape policy decisions and the relationships between citizens, organizations, and governments. They also explore various aspects of change and adaptation, such as learning processes, policy response surges, changes in networks at both local and global levels, the implementation of policies for transboundary issues, and the evaluation of policy successes and failures. A significant resource in this field is the Oxford COVID-19 Government Response Tracker (OxCGRT) (Heemskerk et al. 2024), which gathers publicly available data on 17 indicators of government

Summary

- Lifting border restrictions on tours negatively affected outcomes during the COVID-19 pandemic.
- Mandatory regulations regarding border restrictions work better than voluntary rules in the COVID-19 pandemic.
- Controlling the quarantine period for tours played a key role in mitigating the pandemic.
- The COVID-19 policy analysis tool allows policymakers to identify mistakes.

responses, covering containment and closure policies, economic policies, and health system policies. The OxCGRT project also computes a Government Stringency Index, a combined measure of nine response metrics. The variations in governmental policy responses, as monitored by OxCGRT, may account for some of the differences in the impacts of COVID-19 across different countries. The emphasis of policy science in the context of the COVID-19 pandemic is on science for policy, which includes setting research agendas. While the OxCGRT project did not offer a tool for policymakers to monitor individual performances in managing COVID-19, the proposed tool in this paper is designed to aid in the management of the pandemic for mitigating the pandemic.

Culture and customary behaviors, such as wearing face masks or greeting others with a bow instead of a hug, kiss, or handshake, can have a significant impact on the outcomes of COVID-19. For example, in European countries and the United States, it is common to greet others with physical contact, while in Asian countries it is customary to bow. Landoni et al. revealed that Asian countries have been outperforming the Western world in controlling the COVID-19 pandemic due to their cultural practices (Landoni et al. 2021). However, in 2023, the performance of Asian countries in controlling COVID-19 has deteriorated due to policy changes. This paper examines when these policy changes resulted in significant changes in outcomes for urban management.

The term “urban” characterizes areas with a high concentration of inhabitants, such as cities or towns, while “rural” signifies areas with fewer inhabitants. These descriptors are commonly employed in discussions about population to distinguish between areas of high and low population density. In the realm of urban studies, this article determines policy scores based on the daily cumulative mortality rate of the population. In essence, the study proposed here aims to scrutinize the impact of COVID-19 policy updates on the daily cumulative mortality of the population. The daily cumulative mortality of the population is a result of both policy measures and the variants of COVID-19. The score is derived by normalizing the daily cumulative COVID-19 deaths per million population. This normalization ensures a fair comparison across regions, irrespective of their population size, in the context of COVID-19.

This article’s key contribution is the examination of the influence of COVID-19 policy updates on the daily cumulative population mortality in four countries: South Korea, Japan,

Taiwan, and New Zealand. The findings underscore the importance of meticulous monitoring of COVID-19 policy updates to mitigate the number of COVID-19 fatalities. Conducting retrospective cohort studies is vital for future pandemic management. The lessons learned from the COVID-19 pandemic should be duly recorded and preserved for reference.

In tourism and urban management, analyzing policy outcomes can have life or death consequences. This article presents a case study examining the differences between mandatory and voluntary test-isolation quarantine strategies in the COVID-19 pandemic. Selecting an appropriate policy outcome index is key to evaluating individual tourism policies. In this study, mortality is used as the measure of policy outcomes, as the number of confirmed deaths from COVID-19 is more reliable than the number of infected cases (Adam 2020; Khataee et al. 2021; Focacci et al. 2022; Yuan et al. 2020).

1.1 | Literature Review Methods

A comprehensive literature review was conducted utilizing peer-reviewed publications from the US National Library of Medicine (NLM), the world’s largest trusted database. The review focused on three key areas: safety metrics of COVID-19 policies, COVID-19 mortality rates, and educational safety policy, respectively.

1.2 | Literature Review on Metrics of COVID-19 Policies

In 2020, Adam gave warning on the real-time use of the reproduction number index (Adam 2020). In managing COVID-19, it is crucial to monitor case clusters and establish comprehensive systems for testing individuals, tracing their contacts, and isolating those infected, rather than focusing on the reproduction number. While the reproduction number does indicate the extent of the spread, it does not reflect the rate of infection growth. The number can fluctuate based on a population’s social dynamics; even a highly contagious virus may struggle to spread in an area where social interactions are infrequent. Given its inherent time lag, the reproduction number may not serve as an effective tool for real-time decision-making.

A comprehensive review of literature pertaining to COVID-19 policy in the context of urban management was undertaken. Khataee et al. investigated a quantitative analysis of the impact of social distancing on COVID-19 epidemiology in nine European countries (Khataee et al. 2021). It revealed a strong correlation between the reduction in mobility and the decrease in the basic reproductive number (R_0) and the duration of the initial exponential expansion phase of the epidemic. In other words, the basic reproductive number should incorporate the mobility patterns of individuals and groups.

Focacci et al. examined how different COVID-19 indicators presented in the media influence policy preferences, individual and social behaviors, and understanding these indicators (Focacci et al. 2022). The crude mortality rate was found to be

most effective in supporting virus containment measures, but all indicators were significantly misunderstood by the public. The crude mortality rate is a measure of the number of deaths within a population, scaled to the population over a unit of time. In other words, they recommended the daily accumulative COVID-19 deaths per population over time instead of other indicators such as the reproduction number and infection cases.

Yuan et al. introduced a new indicator, Lifetime Death Probability (LDP), to estimate the lifetime probabilities of death from the top five causes in China and analyzed regional differences and trends (Yuan et al. 2020). Their study found that heart disease and malignancy were the most common causes of death, but there were regional variations. The LDP proved to be an effective tool for comparing health outcomes and could be used for future disease surveillance. In essence, the count of fatalities attributed to COVID-19 over a period of time is instrumental in conducting disease surveillance and formulating health policy outcomes.

The test-isolation strategy aims to identify infected individuals at an early stage through testing, and isolate them from uninfected individuals during the quarantine period. The length of the quarantine period is crucial in mitigating the spread of COVID-19—the longer the quarantine period, the less the virus spreads, and vice versa. However, due to economic considerations, policymakers may make decisions that are not optimal for controlling the COVID-19 pandemic.

This study primarily investigates the influence of tourism policies on the mortality rate amidst the COVID-19 pandemic within the scope of urban management. The tourism policy outcome analysis tool enables users or policymakers to visualize policy outcomes over time, identify trends, and detect faulty assumptions or mistakes made in response to the pandemic. As the data are no longer being updated, a cohort study has been proposed for future pandemics. Analyzing travel behavior is crucial for policymakers to assess the effectiveness of their policies. To our knowledge, there are no articles or textbooks that present examples of tourism policy outcome analysis using a policy analysis tool based on robust statistical theory with mortality as an outcome measure. In this paper, the hiscovid tool provides new insights into the differences in tourism policies among four countries: South Korea, Japan, Taiwan, and New Zealand.

Despite over a year and a half of global vaccination efforts, there has been no discernible trend toward the mitigation of the COVID-19 pandemic in areas where sustained boosting is not feasible (Landoni et al. 2021). As of April 13, 2024, the last date for which Worldometer data are available, the global death toll from COVID-19 stood at 7,010,681. This underscores the need for effective control of the pandemic through policy outcome analysis tools applied to tourism policy. The COVID-19 policy outcome analysis tool enables policymakers to identify and rectify faulty assumptions or errors, thereby potentially reducing unnecessary deaths in future pandemics. The death toll is a critical metric in assessing the severity of a pandemic and can be normalized per million population for comparative analysis (Adam 2020; Khataee et al. 2021; Focacci et al. 2022; Yuan et al. 2020). In essence, the tool for analyzing policy outcomes

should be capable of scrutinizing the cumulative daily death toll over time and assigning scores to individual policies for comparative purposes. Comparing multiple policies can shed light on potential shortcomings in their strategies, with the identification of specific periods being crucial in the analysis of policy outcomes.

A COVID-19 analysis tool, hiscovid, is introduced to fulfill the requirements of the policy outcome analysis and proposed to investigate and identify when policymakers made faulty assumptions or mistakes (Takefuji 2023). The hiscovid tool calculates time-series scores, where the score or population mortality rate is determined by dividing the number of COVID-19 deaths by the population in millions (Takefuji 2023). A lower score indicates a more effective policy. In essence, the results of individual policies are reflected in the time-series data of COVID-19 deaths, a more effective policy results in fewer deaths. The hiscovid tool provides visual feedback on policy effectiveness through calculated graphs. A flat line on the graph indicates successful suppression of COVID-19, while a diagonal line suggests that the policy is not effectively suppressing the virus. The steeper the slope of the diagonal line, the less effective the policy. The horizontal axis displays dates in chronological order, enabling policymakers to identify when mistakes were made or are likely to occur. In other words, visualizing scores over time provides a straightforward way for policymakers to comprehend the implications of their policy outcomes.

1.3 | Literature Review on Mortality Rates

Li et al. explored the link between the cultural trait of flexibility-monumentalism and COVID-19 mortality rates across 37 countries (J. Li et al. 2022). Flexibility-monumentalism represents cultural variances in terms of high versus low self-esteem, self-discipline, and the degree of self-consistency, and provides a contrast with the practicality and adaptability in handling diverse situations with having a steadfast self, guided by unwavering personal values. Li et al. found that flexibility was associated with significantly lower COVID-19 mortality, independent of other factors. Their study also suggested that this effect may be partially mediated through mask-wearing in the early stages of the pandemic.

Pana et al. report that the mortality rate and potential spread of COVID-19 was correlated with international travel (Pana et al. 2021). Therefore, implementing stringent restrictions on international travel at the earliest stages should be considered as a measure to control COVID-19 outbreaks and prevent associated fatalities. In other words, their results can support our conclusions.

An exhaustive review of literature was conducted, focusing on the implementation of border control measures and quarantine periods in the fight against COVID-19. Li et al. found that high-income countries mostly implemented a “ban on regions” policy, while low-income countries primarily used less stringent measures like screening and quarantine (Z. Li et al. 2023). Long-term inbound quarantine was effective in mitigating severe epidemics. However, in countries with medium or high

COVID-19 prevalence, bans on regions were ineffective in the long-term control of the epidemic. In other words, the quarantine period plays a key role in mitigating the COVID-19 pandemic. Their results support our conclusions.

Grépin et al. investigated effectiveness of international border control measures during the COVID-19 pandemic (Grépin et al. 2023). They revealed that symptomatic screening measures were not very effective in controlling COVID-19, while diagnostic-based screening methods were more successful. Targeted travel restrictions and quarantine of inbound travelers were temporarily effective but insufficient in the long run. Most travel restrictions, including border closure, showed little effectiveness. Border control measures were crucial in former elimination locations when combined with strong domestic public health measures. Their results support our proposed claims.

Zhu et al. put forth mathematical models for sustainable border control policy in the COVID-19 pandemic (Zhu et al. 2021). If not properly monitored, imported COVID-19 cases can pose a significant threat to efforts aimed at containing the virus domestically. They suggested that strict border control was justifiable in regions where domestic spread is eliminated. However, regions successfully confining the virus can open to similar regions without additional border controls, provided the imported risk is not increasing. In other words, flexible border control plays a key role in mitigating the COVID-19 and supporting economics.

Dieminger et al. analyzed the perspectives of public health professionals in European border regions on pandemic border control measures (Dieminger et al. 2022). The professionals were skeptical about the effectiveness of border control in reducing COVID-19 spread and expressed concerns about its negative impact on cross-border public health. They emphasized the importance of cross-border communication and collaboration for effective pandemic management, rather than border control. In other words, the importance of border control was justified to support our proposed claims.

Hossain et al. presented a mathematical framework that considers the different risks posed by imported and secondary COVID-19 cases to community spread (Hossain et al. 2020). Using data from the top 10 cities visited from Wuhan, China, the study demonstrated the effectiveness of control measures in delaying the arrival time of outbreaks. However, it emphasized the importance of reducing incidence at source regions along with implementing control measures in susceptible regions. In other words, identifying source regions and domestic control measures can play a key role in delaying the arrival time of outbreaks.

Burns et al. reviewed to assess the effectiveness of international travel-related control measures during the COVID-19 pandemic on infectious disease transmission and screening-related outcomes (Burns et al. 2021). Their study suggested that while travel restrictions may limit disease spread, symptom/exposure-based screening at borders alone is likely ineffective. PCR testing at borders could detect more cases, but quarantine, particularly when combined with PCR testing, is likely to

prevent further transmission from travelers. The effectiveness of these measures depends on various factors such as community transmission levels, travel volumes, and other public health measures in place. In other words, implementing policies that encompass both border control measures and quarantine periods proves to be effective.

Chen et al. revealed that Taiwan stopped foreign nationals from entering the country from March 19, 2020 due to the COVID-19 pandemic (Chen et al. 2022). Their study looked at how this lockdown policy affected tourists. It found that tourists stayed about 33.5 nights longer, spent less on food, transport, entertainment, and shopping, but more on accommodation. While tourist satisfaction decreased, their intention to revisit did not change.

During the COVID-19 pandemic, many countries adopted international travel controls. Yang et al. through the analysis of data from 165 countries revealed that early implementation of these travel controls resulted in an average delay of 5 weeks in the first peak of epidemic cases (Yang et al. 2022). In essence, the achieved delay of 5 weeks can be leveraged to enhance preparedness measures against the COVID-19 pandemic.

Chilla et al. analyzed COVID-19 spread in 10 European border regions, identifying geographical differences in incidence (Chilla et al. 2022). Using 14-day incidence rates, three pandemic “waves” were delineated. Their study found both symmetry and asymmetry of incidence rates within border pairs, leading to a typology characterizing symmetric border pairs, asymmetric pairs without spillover effects, and asymmetric with spillover effects. Border control measures were enacted but were only effective in certain cases. Their study concluded that timing and combination with other non-pharmaceutical measures are crucial for the effectiveness of border controls. In other words, flexible border controls can achieve effective outcomes.

The comprehensive studies reviewed found that border control measures can be effective in mitigating the spread of COVID-19, but the effectiveness depends on several factors, including the type of measure, the duration of the measure, and the timing of the measure.

Specifically, the review studies found that:

- Long-term inbound quarantine was effective in mitigating severe epidemics.
- Symptomatic screening measures were not very effective in controlling COVID-19, while diagnostic-based screening methods were more successful.
- Targeted travel restrictions and quarantine of inbound travelers were temporarily effective but insufficient in the long run.
- Most travel restrictions, including border closure, showed little effectiveness.
- Border control measures were crucial in former elimination locations when combined with strong domestic public health measures.

- Flexible border control can be effective in mitigating the spread of COVID-19 and supporting economics.

The studies also found that the effectiveness of border control measures can be enhanced by:

- Early implementation of the measures.
- Combining the measures with other non-pharmaceutical interventions, such as testing, tracing, and isolation.
- Considering the local context, such as the level of community transmission and the availability of resources.

Overall, the comprehensive studies reviewed suggest that border control measures can be an effective tool in mitigating the spread of COVID-19, but they should be used as part of a comprehensive strategy that also includes other non-pharmaceutical interventions.

1.4 | Literature Review on Educational Safety Policy

Jang et al. studied and scrutinized prior literature on the online safety of children and youth under the “4Cs risk framework” (contact, content, conduct, and contract risks), and compares the institutions, governance, and government-led programs of Australia, Canada, and the United Kingdom (Jang and Ko 2023). It highlighted the need for a regulatory approach to minimize online risks for children under 13, and advocates for a “multi-level” policymaking under a “multi-stakeholder approach.” It suggested the establishment of a dedicated agency for online safety in each country, and emphasizes the role of parents and teachers in promoting digital literacy (Jang and Ko 2023).

De Voto et al. examined the influence of federal/state-level policy guidance and local context on district and school leader responses to the COVID-19 pandemic, providing insights into K-12 crisis leadership and policy sensemaking (De Voto et al. 2023). Data from two districts (2020–2022), including interviews, policy documents, and survey responses, were analyzed using sensemaking, crisis leadership/management, law/policy implementation, and organizational theory. Findings revealed that both federal/state-level guidance and local capacities influenced K-12 leaders’ responses to COVID-19, with well-resourced districts better positioned to respond. Their study argued that the pandemic offers insights into critical factors influencing K-12 crisis responses and discussed the potential role of intermediate service agencies and principal preparation programs in addressing such challenges (De Voto et al. 2023).

The Support and Aid to Families Electronically (SAFE) pilot program, a community-university partnership, was developed to assist parents of elementary students in Ontario and provide practicums for social work students during COVID-19 (Sanders et al. 2024). Their study aimed to assess the feasibility of SAFE as a mental health support for families, focusing on demand, acceptability, and implementation. Qualitative data from various sources were analyzed. The demand for SAFE persisted beyond the pandemic, and it was highly accepted. Their study

offered guidance on implementing SAFE, potentially addressing service provision gaps and the ongoing crisis in field education (Sanders et al. 2024).

Frazier et al. introduced a comprehensive framework for implementing Social and Emotional Learning (SEL) programs in educational settings to enhance mental health and wellbeing (Frazier and Doyle Fosco 2024). Drawing from the Greek myth of Icarus and Maya Angelou’s poem “Still I Rise,” it explored contrasting definitions of success. The PRICES framework (Preparation and Access, Restoration, Integration, Connection and Community, Educator Support, Strengths-Based Cultivation, and Student Voice) was presented as a method for implementing SEL programs. It encouraged a holistic approach to education, nurturing social and emotional development alongside academic achievement, and fostering community, thereby positively impacting the mental health and overall flourishing of students and educators (Frazier and Doyle Fosco 2024).

Almazroui delved into alternative learning methods for chronically ill students, who face challenges due to frequent absences from school (Almazroui 2023). He reviewed international practices and recent research in the context of hospital schools, SMART hospitals, and SMART learning technologies. He focused on the situation of hospitalized students in Dubai and proposes the Edu-Med Care Model, an alternative education program built on SMART education and healthcare approaches. The model aimed to help students overcome barriers to conventional learning spaces, and he evaluated its strengths and limitations (Almazroui 2023).

Murry et al. explored the widening academic disparities in racialized school settings, focusing on the disproportionate impact on African American youth (Murry et al. 2023). It tested the efficacy of a culturally tailored, family-based preventive program, the Strong African American Families (SAAF), in fostering changes in academic promotive parenting practices. The study finds that the SAAF program positively influences parental academic race-related socialization, indirectly reducing school compromising behaviors by enhancing racial pride. Despite discrimination compromising academic success, their study underscored the protective role of racial pride. It concluded that family-based prevention programs can address academic disparities by enhancing protective processes that buffer youth from racialized school environments (Murry et al. 2023).

Wang evaluated the impact of natural disasters on student enrollment in higher education, considering both immediate and long-term effects (Wang 2024). Using PRISMA guidelines, multiple databases were searched, yielding 22 studies for detailed analysis. Findings suggested that natural disasters negatively affect enrollment, particularly among disadvantaged populations, impacting various aspects of the process due to infrastructural and psychological impacts. His study proposed resilience-enhancing measures such as online learning, financial support, flexible policies, mental health services, disaster preparedness training, resilient infrastructure, and collaborative programs. It underscored the need for comprehensive, context-specific disaster management strategies, offering valuable insights for disaster management, educational policy, and future research (Wang 2024).

Ogakwu et al., involving 97 university students, investigated the management of academic stress and school adjustment using rational emotive behavioral therapy (REBT) (Ogakwu et al. 2023). Adopting a pretest–posttest control group design, it measured academic stress and adjustment at three points. Results indicated that REBT significantly improves stress management and academic adjustment among Industrial Technical Education students, with effects sustained at follow-up assessment. Their study found no interaction effect of groups and gender. They concluded that REBT exposure reduces academic stress and improves adjustment, suggesting that school counselors should use REBT to assist students experiencing high stress and maladjustment (Ogakwu et al. 2023).

Breese et al. explored the opportunity gap and implicit biases among preservice educators, focusing on their awareness of individual, structural, and systemic racism (Breese et al. 2023). The sample comprised 154 preservice educators enrolled in a mandatory anti-bullying/harassment/discrimination training in New York State. Content analysis revealed frequent biases toward Asian/Asian Americans, Black/African Americans, males, and socioeconomically disadvantaged individuals. Despite an open-minded approach to discussing bias, many participants showed no intent to change potentially biased interactions with students. Their study highlighted the alignment of racially held biases with critical race theory tenets and discusses implications for antibias training and professional development (Breese et al. 2023).

This review examines research relevant to educational safety policy. One study focuses on online safety frameworks to protect children. Another explores how school leadership during crises like COVID-19 can impact safety. Mental health support for students through programs or family interventions is also addressed. The importance of social–emotional learning to promote student well-being is highlighted. Studies explore alternative learning methods for students facing challenges like chronic illness and natural disasters. Finally, the need to address implicit biases among educators to ensure a safe and equitable learning environment is emphasized.

2 | Methods

The proposed hiscovid tool is used for analyzing the tourism policies to visualize and identify when policymakers made faulty assumptions or mistakes (Takefuji 2023). The hiscovid tool was used to evaluate outcomes of individual policy updates of 10 European countries (Takefuji 2022).

Time-series scoring individual policies are based on the daily cumulative population mortality: dividing the number of cumulative COVID-19 deaths by the population in millions over time. The lower the time-series score, the better the policy. If there is a flat line on the calculated graph, it indicates that the COVID-19 epidemic is well controlled and suppressed. If the graph includes a diagonal line, the greater the slope of the line in the graph, the worse the policy. The horizontal axis is the date, which allows the hiscovid tool to identify when policymakers made mistakes against COVID-19.

3 | Result

The hiscovid tool can automatically scrape the latest data set over the Internet and calculate scores of given countries. Scoring individual policies is based on the cumulative daily population mortality over time: dividing the number of cumulative COVID-19 deaths by the population in millions.

We must explain why the four countries under consideration were chosen for policy outcome comparison. Landoni et al. revealed significant differences in COVID-19 mortality rates across countries, with a notable disparity between Asian and European nations (Landoni et al. 2021). Factors such as population age, prior epidemic experience, social acceptance of distancing and masks, smoking rates, and genetic prothrombotic mutations were analyzed. The timing of the epidemic's impact on a country also influenced mortality rates.

Tran et al. (2020) reported and explored how experiences from the SARS outbreak influenced early COVID-19 tourism policies in New Zealand and Taiwan. Analyzing data from four APEC economies, findings reveal that while COVID-19 significantly hurt tourism, the impact was less severe in Taiwan and Hong Kong—countries with SARS experience—compared to New Zealand and Thailand, which experienced stronger negative tourism effects.

From the onset of the COVID-19 pandemic until approximately April or May 2022, Taiwan and New Zealand emerged as the two Asian nations with the most effective COVID-19 policies. For comparative purposes, two other Asian countries, Korea and Japan, were also selected for analysis.

It is important to understand that there are two primary categories of COVID-19 policies globally: mandatory laws that carry penalties for noncompliance and voluntary laws that serve as recommendations without any associated penalties (LOC.GOV 2020).

This paper shows a case study of four countries such as New Zealand, Taiwan, South Korea, and Japan.

The graph of Japan shows the outcome of the voluntary test-isolation policy. There is no flat line observed throughout the entire period in Japan. The hiscovid tool allows policymakers to visualize the outcomes when they made faulty assumptions or mistakes.

4 | Discussions

In this section, we utilize a chronological sequence of official COVID-19 policy updates (GOVT.NZ 2022; GOV.TW. 2021, 2022a, 2022b). In Figure 1 as of February 23, 2023, New Zealand made one and only one mistake in the COVID-19 policy in February 2022 because of the sharp clip point in February 2022. New Zealand lifted border regulations in February 2022 (GOVT.NZ 2022). The vertical axis indicates time-series scores of individual policies. New Zealand adopted mandatory regulations by law on test-isolation strategy. The test-isolation strategy is to test and identify infected individuals at an early stage and to isolate them from uninfected people during the quarantine period.

The graph of New Zealand is a flat line until February 2022 from the beginning of the pandemic so that the mandatory test-isolation policy had been well controlled and suppressing the COVID-19 pandemic.

Taiwan made two mistakes in May 2021 and May 2022. The first was due to non-tested crews and their families in May 2021 (GOV.TW 2021). The second was the lifting border regulations on tour (GOV.TW 2022a, 2022b). Taiwan did cut COVID-related quarantine for arrivals to 3 days (GOV.TW 2022b).

The graph of South Korea is completely different from the graphs of Taiwan and New Zealand. Since December 2020, there is no flat line but diagonal line in South Korea. Suddenly, the steeper line around February 2022 is observed due to the president election (Yu et al. 2022). South Korea adopted the voluntary test-isolation policy. Three lines of Taiwan, New Zealand, and South Korea show that there is a significant outcome difference between mandatory regulations in Taiwan and New Zealand and voluntary regulations in South Korea. The mandatory test-isolation policy can successfully suppress and mitigate the COVID-19 pandemic.

According to policy updates in Taiwan and New Zealand, lifting border regulations with shorten quarantine period can significantly affect the outcome of the COVID-19 pandemic. The voluntary test-isolation policies adopted in Japan and South Korea did not suppress and mitigate the pandemic.

Therefore, policymakers must observe time-series daily outcomes of their policies to control the border regulations and the quarantine period respectively. Unfortunately, international communities deleted entire datasets of Taiwan in 2023 without any advanced announcements. Datasets for New Zealand, South Korea and Japan are only applicable for reproducibility validation.

From the perspective of educational safety policy, updates to policies significantly impact their outcomes. It is imperative for educational safety policies to incorporate appropriate updates to safeguard student lives. The findings underscored that tracking daily cumulative COVID-19 fatalities is pivotal to the effectiveness of educational safety policy.

5 | Conclusion

This research highlights the importance of monitoring policy outcomes with real-time data. The hiscovid tool demonstrates how daily death rates can reveal the effectiveness of COVID-19 policies. The case study of four Asian countries (New Zealand, Taiwan, South Korea, and Japan) emphasizes this. Countries with mandatory test-isolation policies (New Zealand and Taiwan) achieved better results compared to those with voluntary policies (South Korea and Japan). This suggests a need for policy science on safety to be adaptable and incorporate data-driven updates to safeguard students during pandemics. Just as daily COVID-19 deaths informed effective policies in this study, tracking daily health outcomes can guide adjustments to educational safety measures to best protect humans.

This article advances a case study of tourism policy outcome analysis of four countries—South Korea, Japan, Taiwan, and New Zealand—with the newly introduced tool, hiscovid from safety policy perspectives to save lives. The hiscovid tool discovered the following new findings:

1. Taiwan made two mistakes in May 2021 and May 2022.
2. New Zealand made a single mistake in March 2022.
3. South Korea made the single biggest mistake in presidential election around February 2022.

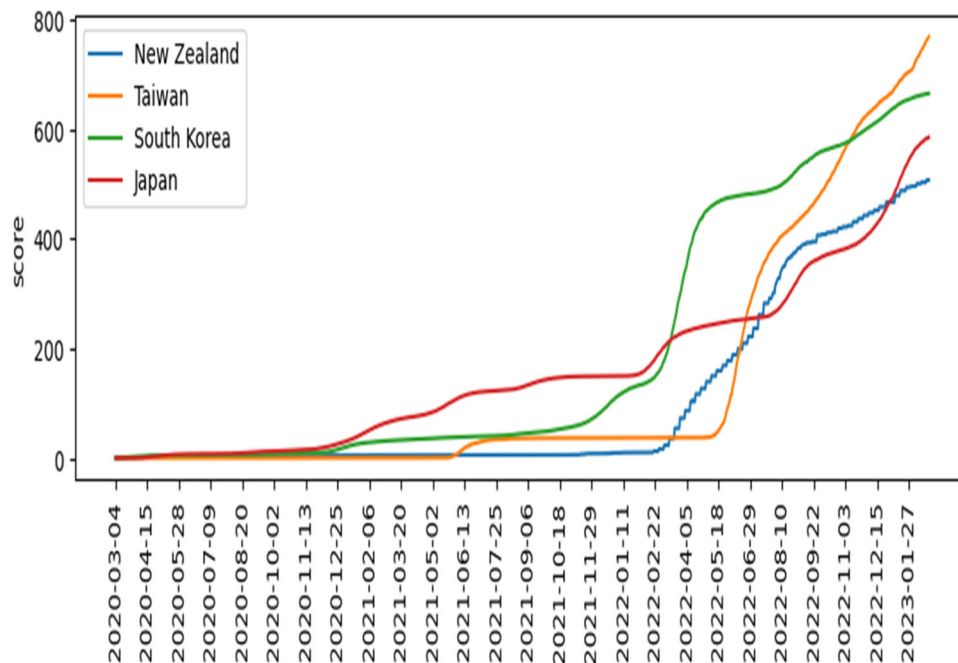


FIGURE 1 | Time-series scores of South Korea, Japan, Taiwan, and New Zealand as of February 23, 2023.

4. Japan made many small mistakes with the leaky voluntary test-isolation policy.
5. The effectiveness of the mandatory test-isolation policy adopted in Taiwan and New Zealand was observed in the flat graph.
6. Controlling the quarantine period plays a key role in mitigating the COVID-19 pandemic.

Author Contributions

Yoshiyasu Takefuji completed this research, wrote Python programs, and wrote this article.

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The author has nothing to report.

Conflicts of Interest

The author declares no conflicts of interest.

Data Availability Statement

The author has nothing to report.

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