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PII: S1876-0341(21)00272-0
DOI: https://doi.org/10.1016/j.jiph.2021.09.010
Reference: JIPH 1703

To appear in: Journal of Infection and Public Health

Received Date: 24 April 2021

Please cite this article as: Takefuji Y, Technological forecasting plays a key role in mitigating the pandemic, Journal of Infection and Public Health (2021), doi:https://doi.org/10.1016/j.jiph.2021.09.010

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Technological forecasting plays a key role in mitigating the pandemic

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ABSTRACT:
Vaccines against COVID-19 are available, but side effects, safety, and efficacy need to be considered. In order to mitigate and end the pandemic, we must explore and examine what is the most effective to use technology. This paper demonstrates the effectiveness of digital fences by comparing seven countries that use them with five countries that do not use them. Based on an evidence-based analysis for mitigating and ending the pandemics from a management perspective, an optimal policy that combines digital fences with vaccination is needed. Vaccination alone will not end the pandemic.

KEYWORDS:
COVID-19 pandemic; vaccine; digital fence; evidence-based analysis

TEXT:
It is important to analyze the COVID-19 pandemic from the viewpoint of leadership, political intervention against science and public health policy, social and cultural differences, who are advising to leaders¹. However, such an analysis is ambiguous and
the pandemic must be analyzed in terms of scientific evidence. In order to assess policies or technologies, the number of daily deaths per population (million) due to COVID-19 can be used for scoring the performance of individual policies\(^2\).

In this paper, we analyze the digital fence technology by scoring the performance of individual policies of twelve counties.

Isolation against COVID-19 plays an important role in mitigating pandemics, but has been rarely studied due to the small number of countries that have adopted it\(^3\)\(^4\)\(^5\).

It is crucial to isolate asymptomatic, presymptomatic and reinfected carriers of the severe acute respiratory syndrome 2 (SARS-CoV-2) and to prevent contact with uninfected persons.

In other words, there is not only pharmacological technology, including vaccines, but also digital fence technology to mitigate and end pandemics.

Testing infected carriers with the digital technology is called a digital fence\(^3\) using mandatory smartphone coronavirus apps which reveals the remarkable achievement for mitigating pandemics.

Identified infected carriers must face mandatory two-week quarantines. The more infected carriers are discovered and isolated from uninfected persons, the better performance the digital fence can achieve.

The effectiveness of the physical isolation policy using the digital fence can be observed in the following countries: Taiwan, China, New Zealand, South Korea, Australia, Iceland and Saudi Arabia. The strongest policy is called a robust digital fence.

Table 1 shows scores of twelve countries including Australia, China, France, Germany, Iceland, Israel, New Zealand, Saudi Arabia, South Korea, Taiwan, United Kingdom, and United States, as of June 26 2021. In Table 1, digital fence’s shows effectiveness in twelve countries.

DISCUSSIONS:

Seven countries including China, New Zealand, Taiwan, Australia, South Korea, Iceland, and Saudi Arabia have been successfully mitigating the pandemic without vaccines. Five countries - Israel, Germany, France, the United States, and the United Kingdom - do not use digital fence technology, only use vaccination technology.

There are three types of digital fences: a robust digital fence (mandatory Apps), a leaky digital fence (voluntary Apps), no digital fence. The more robust digital fence, the better score can be observed in digital fence countries.

Israel has utilized the surveillance technologies of the Israel Security Agency (ISA) to trace patients and those with whom they came into contact during the period from mid-March 2020 to early June 2020\(^3\). However, in response to a ruling by the Israeli
Supreme Court requiring the ISA activities to be defined in legislation and public criticism over privacy concerns, the government announced on June 8, 2020, that it would no longer utilize ISA surveillance for tracing COVID-19 patients³.

Israel was the first country to be vaccinated, but it has not been able to completely mitigate the pandemic as of April 23 2021. As of June 26, about 57 percent of the country’s population has already been given two shots of COVID-19 vaccine. The total number of deaths in Israel is 6429. The score of Israel is 742.4.

However, according to New York Times, Israel, a world leader in vaccinations, faces a New Outbreak⁶. This means that vaccination alone cannot end the pandemic. According to the result of Israel, vaccines alone cannot end the pandemic while a robust digital fence is needed for mitigating and ending the pandemic.

Saudi Arabia has a population of 35.25 million and the number of deaths due to the COVID-19 is 7760. The score is 222.9, not too good, but not bad either. Because Saudi Arabia has been using a voluntary digital fence instead of a mandatory robust digital fence. The effectiveness of the leaky digital fence is weaker than that of other digital fence countries.

Physicians must understand the digital fence with/without vaccine for mitigating the pandemic, in addition to about transmission, diagnosis, and treatment of COVID-19.

Because of testing backlog amid largest outbreak and a shortage of COVID-19 vaccine, Taiwan is now struggling. In digital fence technology, the COVID-19 testing plays an important role in its effectiveness. Testing backlog degrades the digital fence performance.

The author has no conflict of interest. The research has no fund. The manuscript has not been published previously and is not under consideration for publication elsewhere.
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Table 1 Scoring twelve countries on COVID-19 as of June 26 2021

score=deaths/population(millions)

| country              | deaths | population | score | digital fence |
|----------------------|--------|------------|-------|---------------|
| China                | 4636   | 1439.32    | 3.2   | yes           |
| New Zealand          | 26     | 4.82       | 5.4   | yes           |
| Taiwan               | 623    | 23.82      | 26.2  | yes           |
| Australia            | 910    | 25.5       | 35.7  | yes           |
| South Korea          | 2013   | 51.27      | 39.3  | yes           |
| Iceland              | 29     | 0.34       | 85.3  | yes           |
| Saudi Arabia         | 7760   | 34.81      | 222.9 | yes/beginning |
| Israel               | 6429   | 8.66       | 742.4 | yes/later no  |
| Germany              | 90761  | 83.78      | 1083.3| no            |
| France               | 111113 | 65.27      | 1702.4| no            |
| United States        | 603886 | 331        | 1824.4| no            |
| United Kingdom       | 128353 | 67.89      | 1890.6| no            |