

The COVID-19 Infodemic and Intellectual Empowerment

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Abstract

This paper focuses on the infodemic that has misled the public as regards the pandemic of the novel coronavirus disease 2019 (COVID-19) through the spread of both misinformation and disinformation. The term “infodemic” refers to an overabundance of unreliable information, inhibiting the public’s ability to take appropriate action, in this case as regards the COVID-19 pandemic. Referring to a number of relevant cases, the author considers the impact of the infodemic on the public’s ability to combat communicable diseases and the engagement of citizens in infodemic management through intellectual empowerment. The author concludes that infodemic management concerns not just the development of skills in terms of controlling the quality of information provided to and shared with the public, but also the process of knowledge co-creation in which professionals intellectually empower lay citizens to identify, act on, and monitor the steps required for the effective control of the COVID-19 pandemic.

Keywords: infodemic, misleading statements, medical conservatism, intellectual empowerment

1. Introduction

This paper notes the phenomenon known as an infodemic¹ in which the spread of misinformation and disinformation (hereafter mis- and disinformation)² prevents stakeholders from taking proper action to control the spread of COVID-19 and considers how citizens³ can become resistant to this challenge.⁴ The COVID-19 pandemic has given rise to an infodemic that is misleading the public regarding the consequences of wearing a face mask, the efficaciousness and safety of vaccines, and the value of existing drugs or remedies. The COVID-19 infodemic can be attributed to the prevalence of information and communication based on unscientific evidence. This infodemic has caused consumers to buy and hoard in panic personal protective equipment (PPE), such as face masks and alcohol disinfectant, in order to protect themselves from the risk of infection (Abrams et al., 2020: 2). As a result, medical institutions and people vulnerable to COVID-19 are suffering a lack of supplies of PPE or its extreme unaffordability.

Infodemiology stresses the responsibility of information providers to curb the proliferation of unreliable information when discussing antidotes to the infodemic. In this sense, infodemiologists consider this challenge from the perspective of “management” in which science-based information ought to be circulated, rather than “communication” between citizens regarding the risks they face. However, citizens do not always respond well to science-based information. Some hazards or events deemed by experts to present a low risk become the focus of social and political concern, whereas those perceived as a high risk are often ignored by the public (Smith, 2006: 3120-21). In particular, people in rural communities generally prefer traditional or indigenous knowledge that is deeply rooted in their society. COVID-19 is a threat to the intrinsic values of life and good health that citizens share universally. Therefore, this paper reconsiders the relationship between cultural variations and sharing information essential for sustaining good health. To conclude, this paper considers infodemic management as a process of democracy-based risk communication and posits that intellectual empowerment can co-create the scientifically valid knowledge needed for the effective control of the COVID-19 pandemic.

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2. Infodemiology and Infodemic Management

The WHO Director-General, Tedros Adhanom Ghebreyesus, said at the Munich Security Conference on Feb 15, “We’re not just fighting an epidemic; we’re fighting an infodemic” (Zarocostas, 2020, 676). Sylvie Briand, director of Infectious Hazards Management at WHO’s Health Emergencies Program and architect of WHO’s strategy to counter the infodemic risk, told The Lancet, “We know that every outbreak will be accompanied by a kind of tsunami of information, but also within this information you always have misinformation, rumors, etc.” (Zarocostas, 2020, 676). According to the statement from the WHO, an “infodemic,” in this context, does not mean the spread of mis- and disinformation per se, but the consequence of the failure or delay to take effective measures or actions to control the COVID-19 pandemic (WHO, 2020b, 2020c).

An infodemic then refers to a tsunami or overabundance of unreliable information. However, it cannot be eliminated but instead must be managed, as noted by the WHO (WHO, 2020c). This section briefly outlines infodemiology’s approach to infodemic management and how it enables citizens to access reliable information. Eysenbach translates infodemiology-based infodemic management⁵ into the following four pillars, which are mainly focused on the quality control of information that stakeholders provide.⁶

First Pillar: Pursuing Accurate Knowledge Translation

Accurate knowledge translation should be pursued to make specific knowledge understood by all its end users (Eysenbach, 2020; Tangcharoensathien, 2020). The mistranslation or misinterpretation of knowledge leads to the spread of false or inaccurate information concerning COVID-19, posing a threat to public health and hindering appropriate treatment. The multiple layers of knowledge translation among stakeholders, such as scientists, medical staff, policymakers, businesspeople, and end users, is another challenge to infodemic management. As Eysenbach argues, the interpretation of facts is subject to multiple influential factors such as research, politics, commercial interests, and public interests, which lead to a distorted or biased translation of knowledge (Eysenbach, 2020).

Second Pillar: Knowledge Refinement for Sharing Reliable Information

Knowledge refinement, such as fact checking and quality assurance, are important processes for sharing highly refined and trustworthy knowledge with end users (Eysenbach, 2020). This process is equivalent to self-checking practices, such as fact checking and filtering, frequently observed in SNS communications, accelerating and facilitating the improvement of information quality.

Third Pillar: Developing eHealth Literacy and Numeracy

Eysenbach focuses on building capacity to develop eHealth literacy and numeracy skills to select and assess information provided by multiple stakeholders at different levels of communications (Eysenbach, 2020). The global spread of SNS communications has enabled users to tap into a vast array of unreviewed information. As such, SNS users are required to bear the responsibility for selecting and downloading trustworthy health information.⁷

Fourth Pillar: Monitoring via Infoveillance

Monitoring via infoveillance is enhanced to detect outbreaks of misinformation, rumors, and falsehoods, and to counter them with facts (Eysenbach, 2020; Tangcharoensathien, 2020). This process is relevant to the resistance

to false information or biased knowledge. For this purpose, information providers should be capable of discerning morally/ethically right and scientifically trustworthy information from mis- and disinformation to avoid providing unsubstantiated information.

The original definition of “infodemic” is an overabundance of unreliable information that inhibits stakeholders from properly responding to risk or hazards. Thus, the term infodemic approaches the spread of mis- and disinformation from a quantitative aspect. In this context, the purpose of infodemic management is to diminish the volume of unreliable information circulated in society at a macro level. However, infodemiologists focus on the quality control of circulated information from the perspective of the responsibility information providers should have when they discuss infodemic management. The most significant challenge here is to empower stakeholders to resist the proliferation of mis- and disinformation that misleads the public about anti-COVID-19 actions they are required to take, rather than to make it the stakeholders’ responsibility. Therefore, this misleading information is considered through a number of studies in the next section.

3. Misleading Statements

The term “infodemic” refers to an abundance of unreliable information, however the problem is the information and communication that misleads the public about their thoughts and behaviors in dealing with the COVID-19 pandemic, rather than the volume of false or unreliable information available in society. In this section, the impacts of mis- and disinformation and communication as regards COVID-19 are discussed with reference to the following three examples:

Equivalence of COVID-19 to Seasonal Influenza in the United States

In the United States, particularly in the early phase of the pandemic, the equivalence of COVID-19 to seasonal influenza was considered as evidence for anti-lock down statements, leading to controversies concerning the validity of this information. Faust and Del Rio questioned the annual report by the Centers for Disease Control and Prevention (CDC) which stated that the number of deaths due to COVID-19 (as of early May 2020) appeared to be similar to the estimated number of seasonal influenza deaths (Faust and Del Rio, 2020: 1045). Their paper empirically argues that this equivalence does not match frontline clinical conditions, especially in some hot zones of the pandemic where ventilators were in short supply and many hospitals had been stretched beyond their limits, which had not occurred before in the US, even during the worst of influenza seasons⁸ (Faust and Del Rio, 2020, 1045). Thus, the misinformation-based decisions by government officials and other stakeholders in society posed a threat to public health when attempts were made to reopen the economy and relax limits on businesses (Faust and Del Rio, 2020, 1046). The equivalence of COVID-19 to seasonal influenza encouraged the public to perceive the disease as less serious and risky, leading to an infodemic triggered by misinformation. As described by Mian and Khan, the spread of false information drowns out credible sources and, in turn, results in further public confusion, ultimately leading to an acceleration of virus transmission (Mian and Khan, 2020: 90).

The “Go to Travel” Campaign in Japan

The government of Japan declared an emergency and asked citizens to quarantine themselves for the first time as of June 2020. After fully cancelling the emergency declaration on May 25, 2020, the weight of information shifted

from pandemic control to its compatibility with corporate or business activities. The government decided to incorporate Tokyo in the nationwide tourism promotion led by the government of Japan, named the “Go to Travel” campaign, as it was called in Japanese English, from October 1st, although Tokyo had been excluded from this campaign until then due to the risk of transmitting COVID-19 across the regions.⁹ The Subcommittee on Novel Coronavirus Disease Control, which is a subordinate organization of the Advisory Council on Countermeasures against Novel Influenza and Other Diseases formed by the government of Japan, suggested that Tokyo could also be nominated as an origin/destination for the Go To Travel campaign on the condition of reducing the incidence of COVID-19 cases in the Tokyo Metropolitan Area.¹⁰ In the meantime, the subcommittee stated that financially supporting human mobility between Tokyo and other regions through the Go To Travel campaign should be postponed for the time being.¹¹

However, the Tokyo Medical Association suggested that the government should be cautious about including Tokyo as part of Go To Travel. Meanwhile, the president of the Tokyo Medical Association stated in a press conference on September 17, 2020 that including Tokyo as part of the aforementioned tourism promotion campaign would give rise to a resurgence of COVID-19 infections and hospitalizations by creating the potential for a greater risk of infection.¹² After the inclusion of Tokyo in Go To Travel, the incidence of COVID-19 infections began to considerably increase in early November,¹³ although the causal relationship between the tourism campaign and the number of infections has not been determined.¹⁴ Eventually, the government declared a state of emergency in relation to COVID-19 for the second time on January 7, 2021, which was limited to only Tokyo and the neighboring Kanagawa, Saitama, and Chiba prefectures for the duration of one month from January 8 to February 7th.¹⁵

This miscommunication between science and politics, because of a conflict of interests, misled the public about making decisions to protect themselves from the COVID-19 pandemic.¹⁶ In the face of the pandemic, governments are expected to relay science-based information to the public so they can easily understand the fundamental risks of this virus (Mian and Khan, 2020: 90).

COVID-19 Related Hate Speech

The United Nations sees COVID-19 related hate speech as misleading statements in which certain individuals or groups are unjustifiably blamed for the COVID-19 pandemic and, as a result, are confronted by disparaging communication (UN, 2020). This misconduct could incite members of the public to form prejudices or discriminate against people from hot spots of COVID-19 infection. The UN calls on a variety of stakeholders encompassing UN organizations, member states, social media, the general media, and civil society to combat COVID-19-related hate speech through promoting inclusion, solidarity, and common humanity, giving citizens an opportunity to “build back better” by addressing the root causes of behaviors violating human rights and dignity (UN, 2020).

4. Medical Conservatism: Intolerance of Alternatives to Traditional Remedies

Infodemiologists do not clearly consider cultural variations as a contributing factor to triggering an infodemic. It is clear that intolerance of alternatives, such as disease prevention, vaccination, and new medicine, have hindered proper risk communication¹⁷ in terms of preventing the spread of communicable diseases. The following two cases are relevant to the “medical conservatism” entrenched in a specific community or society, and its proponents do not tolerate alternative medicine or lifestyles due to cultural variations.

HIV/AIDS Denialism

The first case is a reflection on the efforts to prevent the spread of HIV/AIDS by the Republic of South Africa and Thailand in the early 1990s. The use of condoms was the single precautionary measure available to fight HIV/AIDS in its primary phase when no effective remedy or medicine had yet been developed. However, there was a marked difference in the effectiveness of prevention efforts between these two nations in terms of tolerating the use of condoms during sex as a tool for preventing this sexually transmitted disease. In Thailand, the government successfully promoted anti-HIV/AIDS education to enlighten sex workers and successfully achieved a condom-use rate of 100%, contributing to the prevention of the epidemic (Karim, Q. A. and Karim, S. A.: 2020, 39). Meanwhile, the South African government was ambivalent about AIDS.¹⁸ On the one hand, the government clearly recognized its impact on the population. On the other, there was a sense of shame rooted in Africa's conservative, male-dominated culture in which talking about sex and wearing condoms were discouraged. This fueled the suspicion by black people in rural communities that AIDS did not really exist and the distribution of condoms reminded them of the apartheid era's sterilization programs to depopulate African communities.¹⁹ In addition, Sub-Saharan African married women are not free to make their own decisions about reproductive health and sexual relations and are not allowed to use contraceptive methods (World Bank, 2018: 21). The prevalence of HIV infection in South Africa and Thailand were both less than 1 percent, but in 1999, the rate of infection in South Africa rose dramatically to 19.9% while Thailand's rate was only 2.15%.²⁰

The South African government did not successfully engage communities and citizens, including scientists, in effectively implementing their anti-HIV/AIDS measures because South Africans were anxious about changing their traditions or culture, in addition to the spread of misinformation provided by the government.²¹ Some observers believe that had the national government rolled out proper prevention measures in 1998, an additional 343,000 deaths could have been prevented between 1999 and 2007 (Bateman, 2007). The significant lesson from the South African case is that citizens should be encouraged to prioritize good health as an intrinsic value, instead of an instrumental value, by tolerating cultural differences.²²

Face Mask Skepticism

Particularly during the early phase of the COVID-19 pandemic, more people were skeptical of wearing a face mask as an antidote to this emerging virus in some countries or regions. This is strong evidence of the failure to share correct information regarding the effectiveness of face masks in preventing COVID-19 infection. Nevertheless, there is scientific evidence to support the efficacy of using a mask, including cotton masks, in filtering expelled droplets during speech (Fisher et al., 2020).²³ Moreover, as Fisher and his colleagues assert, even non-experts are capable of validating this evidence without high scientific proficiency, meaning that this information is highly sharable among stakeholders, at least in terms of scientific understandability. In this sense, citizens should be intellectually empowered to decouple the promotion of human health from the preservation of their folklore or customs.

5. Intellectual Empowerment for Lay Citizens

Conflicts of interest are also an underlying cause of an infodemic.²⁴ Conflicting interests create social polarization, like the economy-pandemic control dichotomy, and a growing mistrust of both governments and science. Furthermore, the proliferation of SNS communication threatens to fragment the perception of risk through the echo chamber or filter bubble phenomena. Fragmented information should be synthesized into a coherent whole and presented as fact-

based information to be shared with lay citizens who do not have scientific knowledge (Hornsey and Fielding, 2017).

This section considers this challenge from the perspective of democracy-based risk communication through dialog, knowledge co-creation, and collaboration, instead of consensus building among stakeholders who depend on those with influential power.²⁵ Considering the communication of risk as a democratic process, professionals are expected to empower lay citizens to undertake fact-based communication with their community members.²⁶ As a result, lay citizens become capable of making fact-based decisions when they are confronted with an emerging communicable disease that poses a threat to human life such as COVID-19.

An anti-pollution movement in Kita Kyushu City serves as an example of civic empowerment for democracy-based risk communication, although it is not directly applicable to anti-COVID-19 communication due to structural differences regarding conflicting interests. Most of the polluters are local residents of this area, thus they also suffer threats and damage caused by the pollution-related issues. In this sense, pollution should be considered as an issue common to the local community and be dealt with beyond the polluter/sufferer divide.

This anti-pollution movement is exemplified by a group of women residing in the most polluted area (Nakahara Community) of Kita Kyushu City and characterized by the process of knowledge co-creation between local residents, professionals, the local government, and industrial polluters (Hayashi, 1995). This successfully transformed the offense-defense structure of conflict into a public work²⁷ to regain good health, clear skies, clean water, and mutual trustworthiness in the community. This anti-pollution movement is also notable for the fact that citizens in the Tobata Ward of Kita Kyushu City overcame their pollution problems without a trial. This differs from the four major pollution problems, as previously seen in Japan, consisting of two Minamata diseases, Yokkaichi asthma, and Itai-itai disease, where the judiciary took initiatives to fact find and collect science-based evidence. Furthermore, professionals in society helped local residents or lay citizens scientifically verify the damage and health problems that industrial polluters caused (Hiraki, 1998, 151-152).²⁸ Throughout this process, the lay citizens were empowered by learning from professionals about health literacy and numeracy, and gained confidence in undertaking fact-based communication with the local government and industrial polluters (Hiraki, 1998, 153). The citizens in this community signed a pollution prevention agreement with the local government and industrial polluters, marking an achievement in citizen-led risk communication (Hiraki, 1998, 147-153).

The most important lesson of the anti-pollution movement in Kita Kyushu City is that citizens developed the ability to deal with challenges to human health through democracy-based risk communication beyond conflicts of interest between stakeholders.²⁹ In other words, citizen-led risk communication can be successfully decoupled from conflicts of interest. Citizens should be sufficiently intellectually empowered to gain insights into health literacy and numeracy, overcoming their deficits in scientific thinking, as was achieved through tackling the pollution problem in Kita Kyushu City.³⁰ In this context, the science-public relationship should be reconsidered such that scientists view lay citizens not as aliens but as users and active agents of scientific knowledge, and empower them to reflect on the risks they face (Wynne, 1993, Gibbons et al., 1994). Therefore, knowledge co-creation is needed to promote public understanding on science and risk communication through intellectual empowerment. Throughout this process, professionals in society and lay citizens are required to have social accountability for the knowledge they create in collaboration and cooperation, in order to limit the production and dissemination of unreliable knowledge that can lead to an infodemic (Gibbons, 1994: 7).³¹ As Leiss put it, the whole process of risk communication should be audited by both professionals and lay citizens to meet the test of public credibility (Leiss, 1996).

The true purpose of risk communication is to protect an intrinsic value, namely good health. Risk

communication is not a zero-sum game in which one value is included and another is excluded (Slovic, 1987). It is a process not only of exchanging information, but balancing various values and interests as regards fact-based decision-making for risk management. Therefore, risk communication should be reconsidered as a decision-making process and a formulation of a code for good practice to prevent an infodemic.³²

6. Conclusion

The term “infodemic” does not mean the spread of false information per se, but the failure or delay to share fact-based information essential for preventing the spread of COVID-19, as exemplified in some people’s refusal to use a face mask. It is noteworthy that infodemiologists focus on the COVID-19 infodemic and its management from the perspective of quality control in the dissemination of information. They emphasize the quality control of information that stakeholders provide to avoid an infodemic. However, this paper views the infodemic from the perspective of democracy-based risk communication, as observed in the anti-pollution movement in Kita Kyushu City. The true purpose of risk communication is to empower citizens to make a commitment to co-creating the knowledge needed to prevent the spread of COVID-19 beyond the divide between the providers and receivers of information. Hence, citizens should be resistant to false information in order to live with COVID-19 without being misled by an infodemic. In this context, risk communication should be decoupled from any conflicting interests. Intellectual empowerment through dialog, knowledge co-creation, and collaboration with experts is crucial for citizens to share information and establish trustworthiness among stakeholders. In this context, it is suggested that anti-infodemic risk communication should be reconsidered not only from the perspective of infodemic management, as argued by the infodemiologists, but also from that of the democracy awakened by citizens.

Notes

¹ Tangcharoensathien et al defines an infodemic as an overabundance of information - some accurate and some not - that occurs during an epidemic (Tangcharoensathien, 2020). It spreads between humans via digital and physical information systems, making it hard for people to find trustworthy sources and reliable guidance when they need it (Tangcharoensathien, 2020). Infodemic might be exacerbating the COVID-19 pandemic as the spread of mis- and disinformation hinders or delays taking effective steps by citizens against the outbreak.

² The WHO clarifies the difference between the influences of a misinformation-led infodemic and those of a disinformation-led infodemic on the COVID-19 pandemic (WHO, 2020b). Misinformation-led infodemic costs lives due to the continual thriving of the virus provided that diagnostic tests go unused and immunization campaigns (or campaigns to promote effective vaccines) do not meet targets due to a lack of the appropriate trust and correct information (WHO, 2020b). In contrast, a disinformation-led infodemic transmits propaganda type information to mislead the public, polarizing public debate on topics related to COVID-19; amplifying hate speech; heightening the risk of conflict, violence and human rights violations; and threatening long-term prospects for advancing democracy, human rights and social cohesion (WHO, 2020b). In this context, these two types of infodemic are comprehensively understood here as the spread of mis- and disinformation.

³ This paper uses the term “citizen” in this context, rather than public. A report released by The Royal Society in 1985 explains the difference in meaning between these two terms. This report asserts that there are the following five overlapping functional categories regarding “public”: (i) private individuals for their personal satisfaction and wellbeing; (ii) individual citizens for participation in civic responsibilities as members of a democratic society; (iii) people employed in skilled and semi-skilled occupations, the large majority of which now have some scientific content; (iv) people employed in the middle ranks of management and in professional and trades union associations; and (v) people responsible for major decision-making in our society, particularly those in industry and government (TRS, 1985:7 and 31). In accordance with this definition, citizens mean people who participate in the process of resolving scientific issues facing their society or community, constituting a form of democracy.

⁴ As Eysenbach argues, in a rapidly evolving situation such as the COVID-19 pandemic, the rapid rate of new scientific information published and the inability of researchers, policy makers, journalists, and ordinary citizens to keep up with quickly changing facts (Eysenbach, 2020). In other words, facts filter among stakeholders only with reference to the best evidence at the time (Eysenbach, 2020).

⁵ To counter and understand the rapidly changing landscape of the COVID-19 infodemic and develop effective strategies to mitigate its negative side effects such as the spread of false or inaccurate information, on April 7 and 8, 2020, the WHO Information Network for Epidemics (EPI-WIN) organized a 2-day global online consultation on managing the infodemic (Tangcharoensathien, 2020).

⁶ Tangcharoensathien et al. posited the following six policy implication for governments and policy makers to consider as the

result of the online consultation organized by the WHO (Tangcharoensathien:2020):

- Interventions and messages must be based on science and evidence, and must reach citizens and enable them to make informed decisions on how to protect themselves and their communities in a health emergency;
- Knowledge should be translated into actionable behavior-change messages, presented in ways that are understood by and accessible to all individuals in all parts of all societies;
- Governments should reach out to key communities to ensure their concerns and information needs are understood, tailoring advice and messages to address the audiences they represent;
- To strengthen the analysis and amplification of information impact, strategic partnerships should be formed across all sectors, including, but not limited to, the social media and technology sectors, academia, and civil society;
- Health authorities should ensure that these actions are informed by reliable information that helps them understand the circulating narratives and changes in the flow of information, questions, and misinformation in communities;
- Following experiences to date in responding to the COVID-19 infodemic and the lessons from other disease outbreaks, infodemic management approaches should be further developed to support preparedness and response, and to inform risk mitigation, and be enhanced through data science and socio-behavioral and other research.

⁷ Leiss also emphasizes responsible risk communication for which all players in risk management should act responsibly in line with code of good risk communication practice (Leiss 1996:90-94). This responsible risk communication lays the foundations of public credibility essential for the whole process of effective risk management.

⁸ Faust and De Rio. mentions the root of this incorrect comparison as follows (Faust and Del Rio, 2020, 1045):

“The CDC, like many similar disease control agencies around the world, presents seasonal influenza morbidity and mortality not as raw counts but as calculated estimates based on submitted International Classification of Diseases codes. Between 2013-2014 and 2018-2019, the reported yearly estimated influenza deaths ranged from 23 000 to 61 000. Over that same time period, however, the number of counted influenza deaths was between 3448 and 15 620 yearly. On average, the CDC estimates of deaths attributed to influenza were nearly 6 times greater than its reported counted numbers. Conversely, COVID-19 fatalities are at present being counted and reported directly, not estimated. As a result, the more valid comparison would be to compare weekly counts of COVID-19 deaths to weekly counts of seasonal influenza death. ... the number of COVID-19 deaths for the week ending April 21 was 9.5-fold to 44.1-fold greater than the peak week of counted influenza deaths during the past influenza seasons in the US, with a 20.5-fold mean increase (95% CI, 16.3-27.7).”

⁹ The original plan of the government was for the reduction in travel restrictions to begin in August, and Go To Travel was originally intended to start during this month (Anzai and Nishiura, 2021). However, the campaign schedule was moved forward, even as cases were increasing in Tokyo and Osaka and the country was trying to regain control of the epidemic (Anzai and Nishiura, 2021).

¹⁰ As for the opinions released from Subcommittee on Novel Coronavirus Disease Control on September 11th, see the following URL (in Japanese).

https://www.cas.go.jp/jp/seisaku/ful/bunkakai/goto_travel_teigen.pdf. Accessed January 26, 2021.

¹¹ *Ibid.*

¹² As for the statement by the President of Tokyo Medical Association, see the following URL (in Japanese), https://www.tokyo.med.or.jp/press_conference/tmapc20200917, Accessed January 9, 2021.

¹³ As for the time series change of COVID-19 incidence, see the following URL (in Japanese), <https://www.niid.go.jp/niid/images/PDF/covid19/AB21thJP.pdf>, Accessed January 26, 2021.

¹⁴ Anzai and Nishiura conducted a descriptive analysis on this causal relationship, gaining the result that the incidence of travel-associated COVID-19 cases during the tourism campaign was approximately three times greater than the control period of 22 June to 21 July 2020 and approximately 1.5 times greater than the control period of 15 to 19 July (Anzai and Nishiura, 2021). In line with this evidence, they assert that domestic tourism enhanced by Go To Travel may have contributed to increasing travel-associated COVID-19 cases at least during its early stage from 22 to 26 July (Anzai and Nishiura, 2021).

¹⁵ <https://www.mhlw.go.jp/content/10900000/000717124.pdf>, Accessed January 9, 2021.

¹⁶ Fidler hints at infodemic attributable to vaccine nationalism. He argues that ineffective national policies to secure COVID-19 vaccine supplies create a gap between science and politics that makes the pandemic worse and undermines that which science and health diplomacy could achieve (Fidler, 2020:749).

¹⁷ The purpose of risk communication is, as defined by the WHO, to enable people at risk to take informed decisions to protect themselves and their loved ones from threats to their health, economic or social well-being. In addition, it is notable that the WHO includes community engagement in the list of risk communication techniques as well as media and social media communication and mass communication.

For the definition of risk communication by the WHO, see the following website:

World Health Organization, “General information on risk communication”,

<https://www.who.int/risk-communication/background/en/>, Accessed January 12, 2021.

¹⁸ John Jeter “Free of Apartheid, Divided by Disease”, Washington Post, July 6, 2020. Available from:

<https://www.washingtonpost.com/archive/politics/2000/07/06/free-of-apartheid-divided-by-disease/58c06c3a-1185-47cc-83b7-a2f6fad797e7/>. Accessed January 1, 2021.

¹⁹ Douglas and Wildavsky assert the anthropological argument that people, acting within social groups, downplay certain risks and emphasize others as a means of maintaining and controlling the group (Douglas and Wildavsky, 1983).

²⁰ Jeter, *op. cit.*

²¹ From a sociological perspective, Short emphasizes the impact of social institutions and systems on risk perception and acceptance by the public, rather than individual motives, individual errors, or even political ideologies (Short, 1984). Additionally, Nlooto and Naidoo argue that the prescription of traditional, complementary and alternative medicine (TCAM) prior to the roll out of antiretroviral therapy also contributed to a dramatic increase in the number of HIV infections in South Africa (Nlooto and Naidoo, 2016).

²² Sen defines real poverty in terms of capability deprivation, which is *intrinsically* significant, instead of low income, which is only *instrumentally* significant (Sen, 1990:87). Moreover, Sen asserts that freeing persons from poverty is equivalent to the expansion of their capabilities to lead the kind of lives they have reason to value (Sen, 1990:18). In this context being in good health is a significant element of capability, meaning that good health has intrinsic value.

²³ Fisher, et al. evaluate the efficacy of masks to reduce the transmission of respiratory droplets during regular speech and posit that some mask types approach the performance of standard surgical masks, while some mask alternatives, such as neck gaiters or bandanas, offer very little protection (Fisher, et al., 2020).

²⁴ A report published by The House of Lords (THL) in 2000 stressed that political realities cannot be ignored when risk communication is discussed (The House of Lords, 2000). The report asserts that a radically different approach to the process of policy-making in areas involving science is called for (The House of Lords, 2000).

²⁵ The report issued by the Food Safety Commission of Japan (FSCJ) goes as far as to define risk communication as public engagement in its process through dialogue, knowledge co-creation and collaboration, instead of the art of persuasiveness related to how the governments or scientists convince citizens to believe information or knowledge they provide (SFCJ, 2015:2). Therefore, risk communication is relevant to democracy and civil rights.

The CODEX Committee of Food and Agriculture Organization (Codex Committee) states that the fundamental goal of risk communication is to provide meaningful, relevant and accurate information, in clear and understandable terms to build and maintain trust and confidence among all interested parties, facilitating a high degree of consensus and support by them for the risk management options. In this context SFCJ stresses the aspects of democracy or civil rights in their view on risk communication while the CODEX Committee does consensus building through providing trustworthy information for interested parties.

As for the goal of risk communication set by the CODEX Committee, see FAO "Elements and guiding principles of risk communication" <<http://www.fao.org/3/x1271e/X1271E03.htm>> Accessed January 3, 2020.

²⁶ THL's report also stresses the importance of public dialogue and consultation with science for effective risk communication (THL, 2000).

²⁷ In this context public work is the organizational concept of public achievement and the visible effort of ordinary citizens who cooperatively produce and sustain things of lasting importance in their community, nation, or the world (Center for Democracy and Citizenship, 1998:22). It also solves common problems and creates common things (things sounds a bit vague) (Center for Democracy and Citizenship, 1998:22). As for the concept of public achievement and its relevance to democracy, see Boyte (2004), Boyte (2008) and Boyte (2018).

In the meanwhile, TRS asserts that important mechanism for facilitating (risk) communication is to have good public relations organization (TRS, 1985: 35).

²⁸ TRS assert that communicating science effectively to the public can and should be taught formally to all professional scientist throughout the formal education period in order to gain experience in explaining science simply, without jargon and without being condescending (TRS, 1985:34). In addition, this report is notably concluded with the message that scientists should learn to communicate with the public, be willing to do so and indeed consider it their duty to do so (TRS, 1985:35).

²⁹ Slovic carried out an analysis of risk perception and acceptance by the public on the assumption that those who promote and regulate health and safety need to understand how people think about and respond to risk (Slovic, 1987). This research considers the co-learning process by both scientists and the public, most importantly as a means of achieving effective risk communication, asserting that each side, expert and public, has something valid to contribute and must respect the insights and intelligence of the other (Slovic, 1987:285).

³⁰ The WHO also urges its member states to engage and listen to their communities, and to empower communities to develop solutions and resilience against mis- and disinformation (WHO, 2020a, 2020b, 2020c).

³¹ Gibbons et al. distinguish between two modes of knowledge production. Mode 1, is generated within a disciplinary, cognitive context (Gibbons et al., 1994). In contrast to this traditional knowledge, Mode 2 knowledge is created in broader, transdisciplinary social and economic contexts (Gibbons et al., 1994:3).

They state, "in Mode 1 problems are set and solved in a context governed by the largely academic interests of a specific community. By contrast, Mode 2 knowledge is carried out in a context of application. ...In comparison with Mode 1, Mode 2 is more socially accountable and reflexive." (Gibbons et al., 1994:3).

³² The Finnish Institute for Health and Welfare conducted a qualitative survey to analyze risk perceptions and trust towards public authorities in the context of COVID-19 in February 2020. According to the result of this survey, Lohiniva et al. assert that risk communication programs must produce trustworthy and relevant information during the COVID-19 epidemic or pandemic to inform people about risk, influence behavioral change, and encourage participation in decision making about emergency measures (Lohiniva et al., 2020). In addition, they argue that risk communication should be based on a sound understanding of the factors underlying risk perception, risk attitudes and trust towards communicating authorities (Lohiniva et al., 2020).

Acknowledgements

The author would like to thank the Research Institute of Civilization of Tokai University for their support.

Many thanks also to Dr. Yoichi Hirano and Dr. Nakashima for encouraging me to submit this paper to the Special Issue of their journal focusing on the COVID-19 pandemic.

Big thanks to Professor Bob Ashcroft for his constructive comments on my research.

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