

## 論文の要旨

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論文題目 Essays on loneliness during the COVID-19 Pandemic in Japan

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Loneliness is a stressful experience that occurs when a person perceives their social relationships as being of a lower quality and quantity than desired. It is an unpleasant emotional reaction to perceived isolation and is often associated with a perceived lack of connection and intimacy. Loneliness is highly subjective, and a person can be alone without feeling lonely and can feel lonely even when surrounded by people. It is a universal condition that makes a person irritable, self-centered, and depressed and is associated with a 26% increased risk of premature mortality.

Loneliness and social isolation are the major problems in Japan. According to a Japanese government survey, nearly 1.5 million people have withdrawn from society and live secluded lives, mostly locked within the walls of their homes. These people are called hikikomori or shut-ins, which refer to people who have been isolated for at least six months. The most common reasons for loneliness were pregnancy, job loss, illness, retirement, and poor interpersonal relationships. However, a major reason has recently been COVID-19, as more people have cited the pandemic as a major factor in their reclusive lifestyle.

The Japanese economy has been significantly affected by the COVID-19 pandemic. The four interpersonal industries affected by COVID-19 were hospitality, food services, life-related services, and entertainment, which depend on interpersonal work. The World Health Organisation's COVID-19 containment recommendations were found to have altered human behaviour because the majority of people viewed them as limitations. Lockdown measures and subsequent reviews are being implemented due to the ongoing and unpredictable nature of the pandemic. At this time, Japan introduced measures such as the temporary closure of educational institutions as well as stay-at-home and work-from-home policies. In this dissertation, we examine the unprecedented challenges of

the COVID-19 pandemic, particularly loneliness. Also during the pandemic, there was an increasing use of information technology by the Japanese population, particularly smartphones, for information, entertainment, or educational purposes. We also examined whether smartphone use increased loneliness in the Japanese population during the pandemic. Furthermore, we examined whether loneliness varied according to the location of a person in Japan during the COVID-19 pandemic. The following paragraphs describe the various studies in detail.

The title of the first paper is "*A Longitudinal Study on Loneliness during the COVID-19 Pandemic in Japan*" This paper was published in the International Journal of Environmental Research and Public Health in 2022 (Lal et al., 2022). This study explored how the prolonged COVID-19 pandemic has exacerbated existing socioeconomic and health risk factors, and added additional dimensions to the loneliness problem. Considering the temporal extent of COVID-19, which exposes people to various loneliness conditions, we examined the development of loneliness and changing risk factors based on age and gender. We used longitudinal data from Hiroshima University's nationwide survey in Japan, conducted before and during the pandemic, to categorize loneliness into three types: long-term (feeling of loneliness experienced both before and during the pandemic), post-pandemic (feeling of loneliness experienced throughout the whole pandemic period), and fresh (feeling of loneliness experienced only in the last year of the pandemic). Loneliness categorization is important because the prolonged existence of the COVID-19 pandemic has added additional dimensions to the loneliness problem, which existing studies have rarely identified. As a result, the distinction between long-term and fresh loneliness remains unexplained. The weighted logit regression results revealed that many Japanese people have remained or became lonely during the pandemic and identified variations based on gender, age, and changes in socioeconomic and health characteristics. More precisely, almost 52% of the participants experienced long-term loneliness, while 8% of the participants experienced post-pandemic loneliness, and nearly 5% experienced fresh loneliness. Age and having children were associated with long-term loneliness; gender, age, leaving full-time employment, financial literacy, change in health status, and change in depression were associated with post-pandemic loneliness; and gender, having children, living in rural areas, change in household assets, financial literacy, changes in health status, and changes in depression were associated with fresh loneliness. These results indicated that long-term, post-pandemic, and fresh loneliness have distinct characteristics. The

Japanese government should devise distinctive solutions for people suffering from varying loneliness before and during the pandemic rather than adopting a generalized approach.

The title of the second paper is *“Has Smartphone Use Influenced Loneliness during the COVID-19 Pandemic in Japan?”* This paper was published in the International Journal of Environmental Research and Public Health in 2022 (Nguyen et al., 2022). This study explored how the influence of smartphone use can increase the risk of feeling lonely during the COVID-19 pandemic in Japan. Since smartphone use has been recognized as a global public health concern during pre-pandemic. However, it is unclear whether this influence has changed during the ongoing COVID-19 pandemic, during which smartphones have become a particularly important means of communication due to health safety measures restricting personal interactions. We used Hiroshima University’s online survey data collected from 18–28 February 2022, to assess the impact of smartphone use on loneliness in Japan. The final sample included 2630 participants aged over 20 years, with loneliness measured using the UCLA scale and smartphone use calculated as the duration of usage in minutes/day. Weighted logit regression analysis was used to examine the association between smartphone use and loneliness, with other demographic, socioeconomic, and psychological characteristics as explanatory variables. Contrary to conventional evidence, our findings show that smartphone use mitigated the risk of loneliness during the pandemic. This was especially true among females under 65 years old. We found that age, subjective health status, future anxiety, and depression impacted this relationship. The findings of this study can help guide policymaking by showing the importance of providing adequate digital platforms to manage loneliness and mental health during times of isolation.

The title of the third paper is *“Loneliness during the COVID-19 Pandemic: A Comparison of Urban and Rural Areas”*. This paper was published in Sustainability in 2023, (Sulemana et al., 2023). This paper explored differences associated with loneliness between Urban and Rural residents in Japan, during the COVID-19 pandemic. Although studies have explored how loneliness varies between rural and urban areas during the COVID-19 pandemic, the results have been inconsistent, and most studies are observational. Therefore, it remains unclear how urban–rural differences affected loneliness in a pandemic. Our study uses nationwide data to clarify this, covering periods before and during the pandemic. We analyzed a longitudinal dataset from Hiroshima

University's Household Behavior and Finance Survey, which collected demographic, socioeconomic, and psychological characteristics of Japanese adults in 2020, 2021, and 2022, thus reflecting the COVID-19 pandemic timeline. The results show that approximately 50% of those surveyed experienced long-term loneliness, while about 6.5% developed loneliness during the pandemic. Although our weighted logit regression models showed few differences in loneliness during the pandemic between urban and rural areas, socioeconomic changes, such as beginning to live alone, leaving full-time employment, and decreased financial satisfaction, were identified as high-risk factors for loneliness, and their impact varied between rural and urban areas. Our results reflect that rural-urban differences have an effect on people's loneliness during a pandemic but need to be considered together with socioeconomic changes. This knowledge can aid governments and healthcare providers in identifying those most at risk of loneliness within urban-rural regional boundaries.

The findings of this dissertation demonstrate that there were three distinct types of loneliness experienced during the lengthy COVID-19 pandemic, such as long-term, post-pandemic, and fresh loneliness and they have distinct characteristics, where various socio-economic factors of the population are significantly associated with various forms of loneliness. Contrary to conventional evidence on smartphone use and its associated increased risk of being lonely, our results show that smartphone use reduced the risk of loneliness during the pandemic in Japan. Furthermore, when comparing urban-rural loneliness during COVID-19 in Japan, our weighted logit regression models showed few differences in loneliness during the pandemic between urban and rural areas, however socioeconomic changes, such as beginning to live alone, leaving full-time employment, and decreased financial satisfaction, were identified as high-risk factors for loneliness, and their impact varied between rural and urban areas. Our results reflect that rural-urban differences have an effect on people's loneliness during a pandemic but need to be considered together with socioeconomic changes.

This dissertation provides empirical evidence on the different forms of loneliness during a pandemic, but also shows how devices such as smartphones can reduce the risk of loneliness even during a pandemic. Furthermore, it appears that there are no clear differences in the impact of a pandemic on loneliness between urban and rural residents. These findings should urge governments to develop individualized solutions for people experiencing varying levels of loneliness before and during the pandemic, rather than adopting a blanket approach. It will also guide policy-making by demonstrating the importance of providing appropriate digital platforms to address loneliness and mental

health in times of isolation. Finally, it will help governments and healthcare providers identify those most at risk of loneliness within regional urban-rural boundaries.

#### References

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