

# COVID-19 related discrimination in Japan

## A preliminary analysis utilizing text-mining

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### Abstract

To assess the general Japanese population's thoughts on coronavirus disease of 2019 related discrimination by Tweets.

Tweets were retrieved from search queries using the keywords "health care providers and discrimination (no hashtags)" and "corona and rural area (no hashtags)" via the Twitter application programming interface. Subsequently, a text-mining analysis was conducted on tokenized text data. R version 4.0.2 was used for the analysis.

In total, 51,906 tweets for "corona and health care providers", 59,560 tweets for "corona and rural" were obtained between the search period of July 29, 2020 and September 30, 2020. The most common 20 words from the tokenized text data were translated to English. Word clouds with the original Japanese words are presented.

Tweets for corona and health care providers did not suggest significant evidence of discrimination toward health care providers on Twitter. Results for corona and rural area, however, showed the unexpected word "murahachibu" (an outmoded word meaning ostracism), suggesting persistent strong social pressure to prevent bringing the disease to the community. This kind of pressure may not be supported by scientific facts. These results demonstrate the need for continued educational efforts to disseminate factual information to the public.

**Abbreviation:** COVID-19 = coronavirus disease of 2019.

**Keywords:** coronavirus disease of 2019, discrimination, health care providers, rural area, text-mining

## 1. Introduction

Since the declaration of the coronavirus disease of 2019 (COVID-19) outbreak by the World Health Organization on 20 January 2020, the world faces numerous challenges at all levels of society. Fear which is not supported by scientific facts, especially regarding health issues, facilitates the propagation of discrimination – as seen in the social panic moments surrounding leprosy, human immunodeficiency virus/acquired immunodeficiency syndrome, and more recently Ebola.<sup>[1]</sup> Unfortunately, the ongoing COVID-19 pandemic does not seem to be an exception.

During the initial phase of this pandemic, there were multiple reports of abusive behavior specifically toward Asians around the world, since the novel virus was first reported in China.<sup>[2–4]</sup> In Japan, as an Asian country, the discrimination reported thus far seemed to follow a slightly different pattern from that in other countries. The discrimination associated with COVID-19 in Japan is predominantly toward patients, patients' families, and health care providers.<sup>[5,6]</sup> A formal report from the Ministry of Health, Welfare, and Labour of Japan revealed that there were multiple cases where health care providers suffered from discriminatory remarks or behaviors from others such as being refused to use public facilities such as restaurants, hair salons, and their children being refused to attend school.<sup>[7,8]</sup>

Since most of the index cases of COVID-19 in Japan were from urban areas such as Tokyo and Osaka, there has been tension reported between the urban and rural areas in the media.<sup>[9]</sup> These reports describe that visitors from urban areas for any reason may be targeted by people who voluntarily monitor other people's behaviors and may mete out anonymous punishment when they deem it necessary.<sup>[10]</sup> These people have been referred to as "Jishuku keisatsu" or "Self-restraint police" in Japan.<sup>[10,11]</sup> The punishment they inflict ranges from a simple action such as excluding the stranger and the person's family to more aggressive behavior such as putting up a sign to ask the stranger to leave the area, throwing a stone into the place a stranger is staying, and damaging personal property.<sup>[12]</sup>

While these reports describe an interesting aspect of the COVID-19 pandemic, they do not explain how an individual who discriminates thinks or acts. Since Japan is a unique country in which "peer pressure" is considered more important than an individual's perspective,<sup>[13,14]</sup> it is of great importance to explore an individual's frank thoughts. To explore these points of view Twitter was used as an information source to investigate people's

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The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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**Table 1**  
**Top 20 words identified on Twitter regarding corona and health care providers and corona and rural areas.**

Rank	Corona and health care providers	Frequency	Corona and rural areas	Frequency
1	Medicine	66224	Corona	67511
2	Corona	61054	Rural area	66068
3	Dedicated	58326	Infection	15840
4	Infection	21775	People	14527
5	Novel	12672	Not	10658
6	Human, people	12236	Scared	9223
7	Hospital	9179	Tokyo	6884
8	Not	7966	City area	6000
9	Virus	7510	Returning home	4344
10	Patients	5940	1	4317
11	Gratitude	5912	Now	3969
12	Mask	5064	Murahachibu	3929
13	Measures	4970	A lot	3668
14	People (in a polite way)	4927	Good	3532
15	Response	4145	Hometown	3460
16	Vaccine	3986	Prefecture	3408
17	Test	3822	Myself	3291
18	Myself	3800	1 (in kanji)	3047
19	1	3636	Lol	2867
20	Now	3573	Home	2823

Lol = Laugh out loud.

thoughts since Tweets are posted by individuals, except for accounts owned by groups, schools, or businesses.

Text-mining is an emerging method to semi-quantitatively analyze text, which attempts to address global sentiments and self-reported symptoms on Twitter in the face of the COVID-19 outbreak.<sup>[15–17]</sup> By utilizing text-mining techniques on Tweets, people's thoughts related to the pandemic were explored regarding health care providers, and tension between city areas and rural areas.

## 2. Materials and methods

Institutional Board Review approval was not required because this study used information in the public domain. Tweets posted between July 29, 2020 and September 30, 2020 were selected as a raw text source. By utilizing the Twitter application programming interface and the R package “rtweet”, Tweets were retrieved with the search terms of “health care providers AND discrimination (no hashtags)”, “Corona AND rural area (no hashtags)”. Those search terms were selected after multiple runs of different combinations of related search terms to provide the best-matched results. Specifically, the combination of terms of “Corona and health care providers”, “Corona and health care providers AND discrimination”, “health care providers AND discrimination”, “Corona AND rural area AND discrimination”, “Corona AND rural area”, and “Corona AND discrimination” all with AND without hashtags.

The term “Corona” (without a hashtag on twitter) was selected because this word was the most prevailing term used by the Japanese public to refer to the novel coronavirus n-CoV-19 and subsequent infections from COVID-19. Since the Twitter application programming interface returns tweets only from the past 7 to 9 days with a maximum of 18,000 tweets each time, the retrieval process was iterated weekly using the same R commands between July 29, 2020 and September 30, 2020.

The collected text data from Twitter was tokenized with a Japanese-specific tokenizer package available in R called “RMeCab”. Independent nouns, adjectives, and adverbs were extracted to be visualized in word clouds. Data collection and subsequent analysis was performed with R version 4.0.2 (R Foundation for Statistical Computing, Vienna, Austria) (2020-06-22 release). The top 20 words were translated into English (by RS) along with their most common contexts and are presented in Table 1. The original Japanese words were presented in word clouds for each query, where the size of each word is proportional to the frequency of the word in the data.

## 3. Results

In total, 51,906 tweets for “corona and health care providers”, 59,560 tweets for “Corona and rural” were obtained between the search period of July 29, 2020 and September 30, 2020. For each search query, the top 20 words translated into English were presented in Table 1. The word clouds in the original Japanese from the tokenized text data are presented in Figure 1.

## 4. Discussion

This study was undertaken to explore people's thoughts toward health care providers and the tension between urban and rural areas in Japan by analyzing Tweets. To best of our knowledge, this is the first English language study to review COVID-19 related discrimination in Japan utilizing text-mining. It is somewhat surprising that there were no words directly tied to hostility or slandering of health care providers among the top 20 words in this textual analysis. Manual review of the tweets revealed that a large fraction of use of the word “gratitude” was in the news posted on Twitter, not from individuals. It does not seem that health care providers share their experiences on Twitter. As cited above, one could speculate that discrimination toward health care providers might be conducted physically



**Figure 1.** Left: word cloud for Twitter search on health care providers (removed top 3 words), Right: word cloud for Twitter search on rural area (removed top 3 words).

rather than in words,<sup>[18–20]</sup> so that the activities are not logged or tracked.

Twitter analysis from the rural areas, however, showed somewhat surprising results – the word cloud clearly demonstrates people’s fear of being ostracized, probably for bringing the disease into the community from urban areas. “Murahachibu” is a somewhat outmoded word referring to ostracism and was the worst penalty a society could give to its member who committed a “crime”. It was surprising to encounter this word in a Twitter analysis in 2020, implying the strong effect of peer pressure on an individual’s life in Japan – especially in rural areas. Peer pressure, while partially serving as a safeguard against unknown threats to a community throughout history, could result in devastating consequences such as a delay in delivery of timely interventions especially when combined with misinformation.<sup>[21]</sup> One example is the trajectory of Leprosy (Hansen disease). In Japan, patients with Leprosy were not only forced into isolation but also deprived of the freedom to choose their occupation, marriage, and reproduction (for men) until very recently, when the Leprosy Prevention Law was abolished in 1996.<sup>[22,23]</sup> This is an example of nation-wide “Murahachibu”, or ostracism, which was without any scientific basis whatsoever. It is difficult to change culturally rooted attitudes, but education should mitigate controversies between culture and scientific accuracy.<sup>[24]</sup>

There are acknowledged limitations to this study. First, this is a preliminary analysis of available data. Second, this study does not address discrimination against ethnic minorities in Japan. While the population of Japan is quite homogeneous, there are an increasing number of people from other countries in Japan. It is important to look into these population in future studies as well, but these studies must be conducted separately to be statistically meaningful.

## 5. Conclusion

This analysis suggests that discriminatory remarks toward health care providers are not commonly expressed on Twitter in Japan. This preliminary report visualized Japanese general public’s fear during the COVID-19 pandemic, which could potentially be an origin of discrimination. The analysis also reveals people’s fear of

being ostracized for bringing the disease into the community, especially in rural areas. This study also demonstrates the utility of word mining analysis to identify prevailing trends in public opinion which is of great importance in management of public health during widespread outbreaks such as the current COVID-19 pandemic. As Devakumar et al<sup>[25]</sup> noted in his commentary on racism and discrimination in response to COVID-19, fear could be a key factor for discrimination. Public fear may be difficult to control, but continued efforts toward improved public education can eventually lead to rational behavior by the population. Further studies are needed to further understand the mechanism of discrimination. This study may serve as a first step toward improvement of social acceptance in Japanese society.

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## Author contributions

RS is responsible for the analysis and the first draft of the manuscript. RS, YI, and AKL contributed to the subsequent drafts, with AKL final revisions.

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