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Short Communication

Does COVID-19 infection impact on the trend of seasonal influenza infection? 11 countries and regions, from 2014 to 2020

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ABSTRACT

Objectives: Infection due to the 2019 novel coronavirus disease (COVID-19) is dramatically widespread around the world. The COVID-19 pandemic could increase public concern to prevent infectious disease. The present study aimed to assess the relationship between the COVID-19 epidemic and the potential decrease in seasonal influenza cases.
Methods: This study was performed to show trends in seasonal influenza cases from the 2014–2015 season to the 2019–2020 season in 11 countries and regions, and evaluate whether the trends in the 2019–2020 season were different before and after the COVID-19 pandemic compared to previous seasons using a quasi-experimental difference-in-difference design.
Results: In East Asia, the number of seasonal influenza cases in the 2019–20 season was lower after the COVID-19 transmission compared to previous years. However, this was not the case in American countries or in European countries.
Conclusion: The COVID-19 epidemic might have altered health behaviors, resulting in an unexpected reduction of seasonal influenza cases.

Introduction

The number of people infected with the 2019 novel coronavirus disease (COVID-19) has surged worldwide since the first case of COVID-19 was reported in December 2019 in Wuhan, China (World Health Organization, 2020a). COVID-19 has been featured extensively in both traditional and social media, leading to high levels of attention to a previously unknown respiratory disease and to risk perception among the public (Rasmussen and Goodman, 2018). Moreover, infection prevention and control strategies to help prevent the spread of COVID-19 in community settings have aligned with those used for other common respiratory viral infections such as influenza; such strategies have included hand hygiene, cough etiquette, and avoiding close contact with sick persons (Centers for Disease Control and Prevention, 2020). We aimed to identify the relationship between the COVID-19 pandemic and the incidence of seasonal influenza in different regions and countries.

Methods

The subjects resided in the following 11 countries and regions: Northern China, Southern China, Hong Kong, the Republic of Korea, Japan, Taiwan, Canada, the United States (US), England, France, and Germany. We extracted weekly reports of seasonal influenza data from the 2014–15 season through to the 2019–20 season, from epidemiological (EPI) week 40 to EPI week 10, using the open-access databases of each public health authority. The seasonal influenza data was summarized by country and by region. We conducted a quasi-experimental difference-in-difference (DID) design to examine whether the trend in the number or proportion of patients with influenza before and after January 20 of this season (2019–20) was different from those of the previous five seasons (2014–15 to 2018–19). Of note, the Chinese healthcare authorities officially reported human-to-human transmission on January 20, 2020 (The Japan Times, 2020). Therefore, we proceeded on the premise that public concern presumably derived from the COVID-19 pandemic affected the incidence of influenza after January 20, 2020 (EPI week 4).

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Results

Since EPI week 4 of the 2019–20 season, the US, Canada, and European countries have experienced similar trends in the fluctuation of seasonal influenza cases to those experienced in previous seasons. In contrast, some Asian regions experienced different trends in influenza incidence this season from those experienced in past seasons (Figure 1). In Northern and Southern China, the number of influenza patients fluctuated without following any consistent trend in the 2019–20 season. The number of patients infected with influenza in Hong Kong, Japan, and Taiwan was significantly lower after EPI week 4 of the 2019–20 season than in previous influenza seasons. The numbers of influenza cases this season did not peak in these countries as they had in past seasons. Conversely, the number of influenza cases in the Republic of Korea in the 2019–20 season was similar to the number of cases seen in previous years. Although we also investigated the number of influenza specimens tested, the data were unavailable for most countries and regions. We could collect the data in Northern China, Southern China, Hong Kong, the Republic of Korea, and the US (Supplementary material). Based on the available data, the number of influenza tests in the Republic of Korea gradually decreased after EPI week 4 in this season compared to previous seasons. However, the COVID-19 epidemic seems to have had a minor impact on influenza tests in other Asian regions and the US.

Discussion

Since Hong Kong, Japan, and Taiwan are geographically proximal to China, the impact of the COVID-19 outbreak in China might have affected the public more directly in these countries than in other countries. Hong Kong, Japan, and Taiwan reported imported cases from China in the evolving phase of the COVID-19 outbreak, and public concern about the COVID-19 outbreak could have risen dramatically as a result (World Health Organization, 2020a). The citizens of these areas might have taken robust preventive measures, including wearing masks, hand hygiene, and even self-imposed physical distancing. Consequently, these precautionary measures may have helped to prevent influenza transmission.

We propose that not only geographic differences but also cultural differences could have enhanced self-protective habits. For instance, although the degree of protection from virus transmission offered by wearing face masks is uncertain (World Health Organization, 2020b), people in Asian regions routinely wore masks in public even before the COVID-19 outbreak, whereas this practice was not commonly seen in the US or in European countries (Burgess and Horii, 2012; Siu, 2016). Also, norms concerning interpersonal distance, hugging, and handshakes vary from culture to culture (Sorokowska et al., 2017).

The findings of the present study have limitations. First, this study was an ecological study. Therefore, we could not directly analyze the association between the COVID-19 outbreak and behavior changes to avoid respiratory virus infection. Second, our

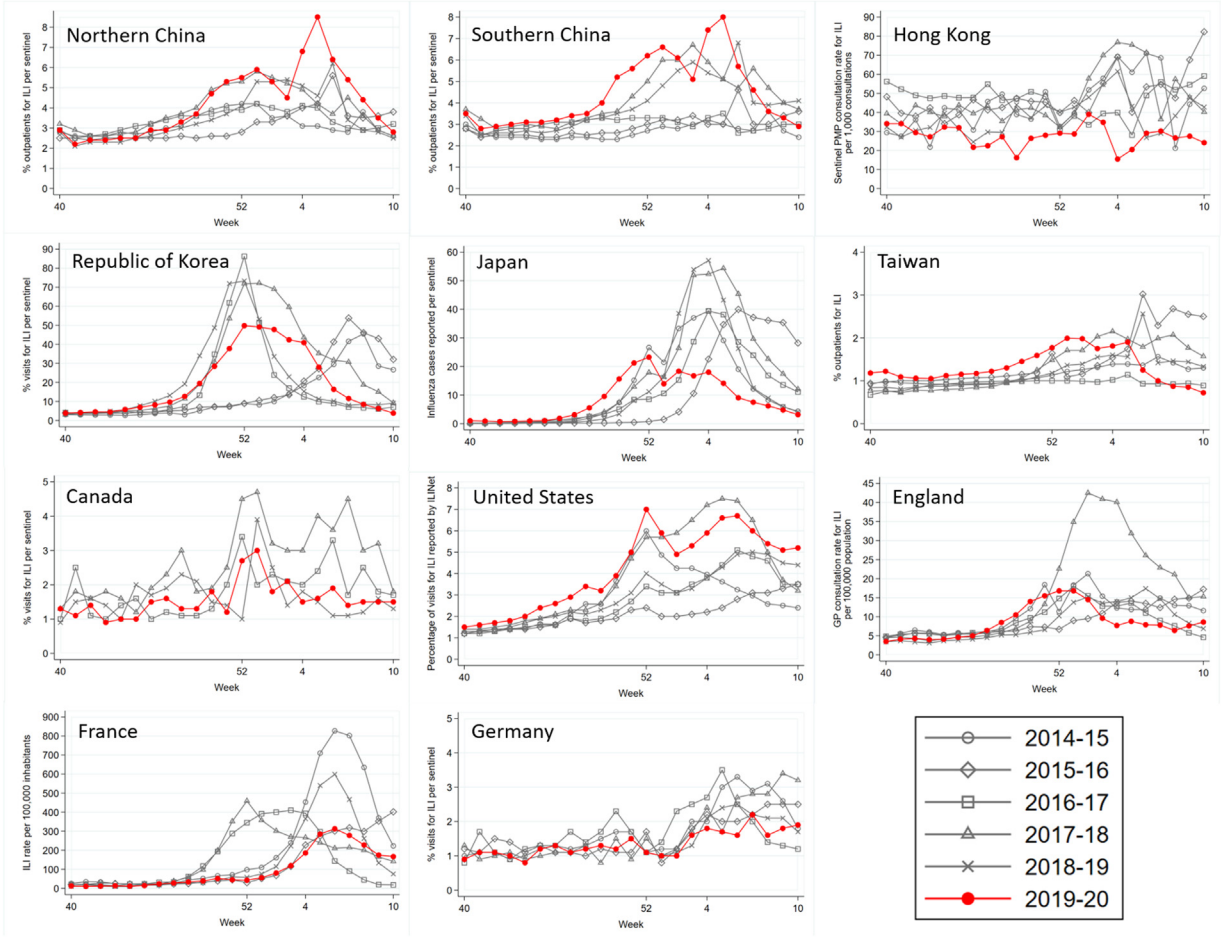

Figure 1. Trends in patients with influenza in 11 countries/regions over six seasons. ILI = influenza-like illness; PMP = private medical practitioner; ILINet = Influenza-like Illness Surveillance Network; GP = general practitioner.

findings might be affected by the number of influenza tests during the COVID-19 epidemic. Still, the present study's results provide some insight into the association between the COVID-19 pandemic and the reduction of other infectious diseases.

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Ethics approval

Because this study involved secondary analysis of publicly available, de-identified data, it was exempt from institutional review board review.

Conflict of interest

All authors have no conflict of interest to declare.

Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.ijid.2020.05.088.

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