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Impact of the COVID-19 declaration of the state of emergency on weekly trends in the care of asthma and COPD in Japan: A retrospective and descriptive study

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Abstract

Introduction: To examine trends in respiratory diseases other than infectious diseases is important for public health issue during coronavirus disease 2019 (COVID-19) pandemic. This study aimed to examine the trends in patient consultations for asthma and Chronic Obstructive Pulmonary Disease (COPD) at Show a University Hospital in Japan during the COVID-19 declaration of the state of emergency.

Methods: This study designed as a retrospective and descriptive study. Subjects were 6,483 patients who had received medical treatment at Show a University Hospital and were diagnosed asthma or COPD from 2017 to 2020. To examine the impact of the COVID-19 declaration of the state of emergency, the number visits to hospital by asthma were summarised from January to September, for each year.

Results: Compared to the average of the previous 3 years, a comparison of the three periods (before, during and after the COVID-19 declaration of the state of emergency) showed a V-shaped curve in 2020, with a large drop in the number of asthma and COPD patients during the COVID-19 declaration of the state of emergency. The number of patients recovered after the COVID-19 declaration of the state of emergency was lifted, but not returned to the pre-declaration level.

Conclusions: This study showed a long-term decrease in asthma and COPD patients visits to Show a University Hospital since the beginning of the COVID-19 pandemic compared to the previous 3 years. It is also possible that medical care that would have been available may not have been provided due to the COVID-19 declaration of the state of emergency, so it is necessary to follow up patients while keeping a close eye on measures other than infectious diseases.

Keywords: asthma; COPD; the COVID-19 declaration of the state of emergency; infection control; japanese.

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Introduction

Coronavirus 2019 (COVID-19) caused a global public health emergency in 2020 [1]. During the COVID-19 pandemic, there was a shortage of medical staff and resources, intensive care units, ventilators, and personal protective equipment (especially medical masks) due to an urgent increase in the number of infected and severe patients. To deter the spread of COVID-19, many countries have imposed a lockdown with restrictions on outings and service closures. The lockdown in most of these countries has compelling force with penalties for violations. The lockdown can be expected to deter the spread of the infection, which would otherwise become destructive, resulting in not only economic damage, but also delays in treatment of patients [2]. While COVID-19 has strongly affects on respiratory diseases, asthma and Chronic Obstructive Pulmonary Disease (COPD) treatment delay is a problem in health systems worldwide. A past respiratory disease review demonstrated that to maximize asthma adherence requires thorough patient care giver education, more frequent patient contact, and patient-clinician partnerships dedicated to effective treatment of asthma [3]. During COVID-19 pandemic, it is extremely important for public health to examine trends in respiratory diseases other than infectious diseases.

Japan was in "mild lockdown," which was not enforceable and non-punitive, during the COVID-19 declaration of the state of emergency; nevertheless, the impact attracted attention [4]. On 7 April 2020, the Japanese government declared a state of emergency due to a COVID-19 outbreak in seven prefectures (Tokyo, Kanagawa, Osaka, Saitama, Chiba, Hyogo, and Fukuoka). Tokyo, host of the 2020 Olympics, had the highest number of infections among the 47 prefectures, and the Tokyo Metropolitan Government imposed its own transferal restrictions on citizens [5]. The COVID-19 declaration of the state of emergency expanded nationwide on 16 April 2020, and was lifted in a phased manner beginning 14 May 2020. While many countries were in lockdown with penalties for violations, Japanese policy for COVID-19 was distinguished as the government "requesting" the public to refrain from going out except for emergencies and to temporarily close certain businesses without penalties for violations. This lockdown significantly transformed public activity as well as patients' medical examination behaviours in Japan. For example, the number of monthly train users in April 2020 prominently decreased by 45.5% compared with the same month in 2019 [6]. The mild lockdown in Japan had a diverse range of influence on people's lives, similar to other countries, including changes in domestic circumstances due to teleworking or school closure and economic damage due to decreased income or job loss.

This study hypothesised that the COVID-19 declaration of the state of emergency suppressed patient visits to hospital for asthma and COPD in Japan. The aim of this study was to compare trends among asthma and COPD patient consultations at one university hospital in Tokyo before and after the issuance of the COVID-19 declaration of the state of emergency

Methods

The present study was a retrospective and descriptive study of Showa University Hospital in Tokyo, Japan. Subjects were 6,483 patients who had received medical treatment at Showa University Hospital (from January to September), and were diagnosed asthma or COPD (International Classification of Diseases 10 [7] code: J44, J45 or J46) from 2017 to 2020. To examine the impact of the COVID-19 declaration of the state of emergency, the number of visits to Showa University Hospital for asthma and COPD were summarised from week 13 to week 19, for each year (Figure 1). Showa University Hospital is located near the border between Tokyo (the most populous prefecture in Japan) and Kanagawa (the second most populous prefecture). There are one of the areas most affected by the COVID-19 pandemic in Japan, because the number of COVID-19 infections has remained high since the early stages of the pandemic. In case of return to the hospital, subjects were defined only as patients with newly diagnosed diseases. To eliminate the weekends effect (hospitals hardly opened), the effectiveness of COVID-19 measures was assessed by calculating the 7-day moving average of the interval from symptom onset to isolation in hospital or quarantine. For each disease, we used Wilcoxon rank sum test to examined the rate of decrease in patients every week between 2020 and average of from 2017 to 2019 (Figure 2).

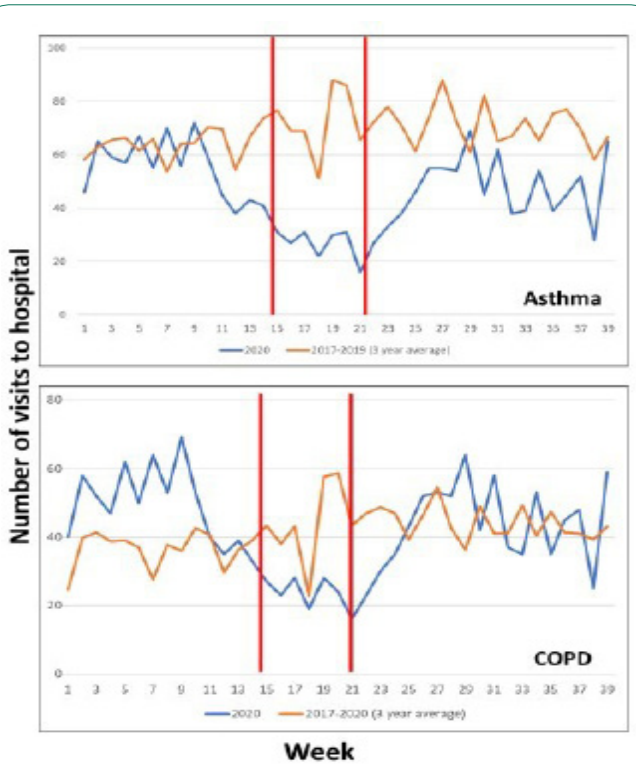

Figure 1: Weekly trends of asthma and copd patients in 2020 compared to the last 3 years (2017-2019).

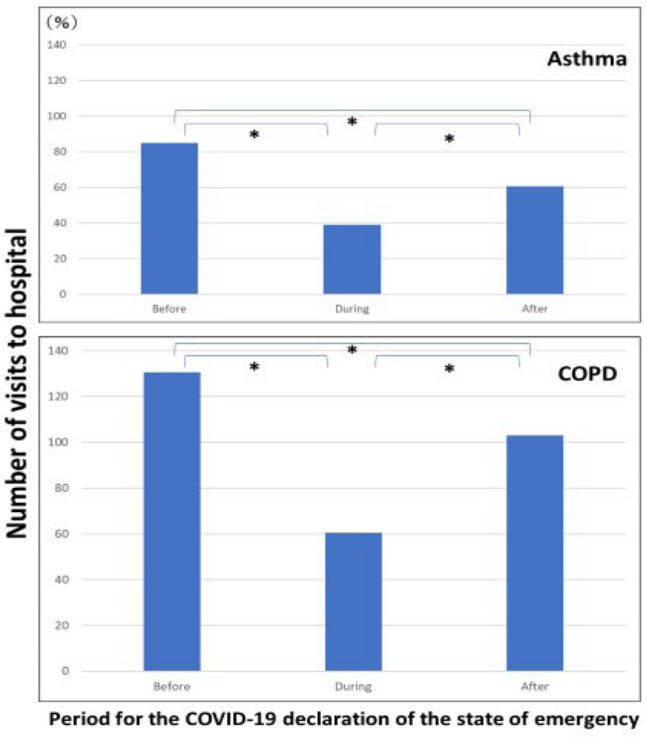

Figure 2: Percentage of asthma and COPD patients in 2020 compared to the last 3 years (2017-2019).
*P<0.05 (Wilcoxon rank sum test)

This study was approved by the Medical Ethics Committee of Showa University School of Medicine (Approval No. 2954). All statistical analyses were conducted using JMP 16.1 (SAS Institute Inc. Cary, NC USA). All analyses were carried out at a 95% confidence interval. P-values less than 0.05 (two-tailed) were considered statistically significant.

Results

Figure 1 summarises weekly trends in the number of asthma and COPD patients visits to Showa University Hospital in 2020 compared to the last 3-year (from January to 120 September). In figures, the start and end of the COVID-19 declaration of the state of emergency are indicated by red lines. Compared to the last 3-year, the number of asthma and COPD patients in 2020 tended to decrease from January to September. In addition, the number of patients decreased significantly during the declaration, and the trends in 2020 was V-shaped. Although the number of patients recovered after the declaration, the number of patients were significantly below the number of before the declaration.

Figure 2 summarises the percentage of patients by asthma and COPD, compared to average of 2017-2019 and 2020. Both COVID-19 pandemic and the declaration were associated with a significantly decline in number of asthma and COPD patients.

Discussion

The results of this study suggest that asthma and COPD patients at Showa University Hospital tended to refrain from seeing a doctor during the COVID 19 declaration of the state of emergency, compared to before COVID-19 pandemic. Furthermore, compared to the situation during the COVID-19 declaration of the state of emergency, there was a tendency to continue to refrain from seeing a doctor after the declaration was lifted. The number of asthma and COPD patients increased after the COVID-19 declaration of the state of emergency, but remained lower than before the declaration.

The effect of public holidays and weekends should be noted. A study of emergency medical visits to a district general hospital in southwest Scotland admissions showed statistically higher mortality associated with admission on public holidays both on weekdays and weekends, but not with weekend admissions generally [8]. In Japan, holidays usually fall between 29 April and 5 May, and the number of hospital visits tends to decrease significantly during this period. It is possible that the vacation (about a week) effect overlapped with the effect of the COVID-19 declaration of the state of emergency. However, since the number of asthma and COPD patient visits continued to decrease even after the COVID-19 declaration of the state of emergency was lifted, it is possible that COVID-19 is having a long-term effect on consultation behaviour regardless of the impact of the declaration.

Emergency infection control measures are essential in hospitals. Although Japan was spared from the 2003 Severe Acute Respiratory Syndrome (SARS) epidemic, hospitals were placed on high alert. In 2003, substantial differences in emergency infection control measures, as perceived by health care workers, exist among hospitals in Japan, with differences across institutions exceeding those across disciplines. To achieve a higher level of preparedness for infectious diseases, institutions should designate and implement effective emergency infection control measures [9]. It is necessary to compare multiple medical institutions and examine regional differences because each region has its own universal health insurance system, and the health care system varies greatly depending on population density and the number of medical institutions in each municipality.

Xiao et al. demonstrated that the lockdown in China due to the COVID-19 pandemic has had a significant psychological impact on cancer patients and their families and showed the importance of psychological support during the pandemic [10]. These results could be affects not only on the patient but also on the family givers. Lapointe-Shaw et al. demonstrated that patients discharged from hospital during the December holiday period were less likely to have prompt outpatient follow-up and were at higher risk of death or readmission within 30 days [11]. Collection of longitudinal data could help examine the effect of public holidays, weekends and the COVID-19 declaration of the state of emergency among Japanese patients. This study suggests that the COVID-19 declaration of the state of emergency may have inhibited the movement of patients with 10 respiratory disease in Japan. However, it is also possible that the medical care that would have been available may not have been provided due to the COVID-19 declaration of the state of emergency, so it is necessary to follow up patients while keeping a close eye on measures other than those for infectious diseases. Moreover, Inoue et al. suggested that the lack of social capital was associated with refraining from seeking medical care among Japanese [12]. When examining regional differences in Japan, it will be necessary to show individual or regional social factors as well.

Limitations

Our study has limitations. This study is based on the trend of consultation at a single hospital, and its generalizability is a challenge. In light of the COVID-19 epidemic, this study provides valuable information showing that patients refrained from attending medical examinations due to the COVID-19 dec-

laration of the state of emergency using data from a single hospital; however, further study using data from multiple hospitals is necessary. It should also be noted that the number of patients for each disease varied. Compared to major disease (such as cancer), this study had a smaller number of patients, and the trends for these conditions may not be readily detectable due to this smaller sample size [13]. Although this study was conducted in one hospital in Tokyo, which has the highest number of confirmed COVID-19 cases in Japan, it has the advantage of being geographically suitable for confirming the effectiveness of the COVID-19 declaration of the state of emergency [14]. Because the COVID-19 epidemic has continued worldwide, and this study is based only on data up to September 2020, a longer-term study is needed.

Conclusions

In conclusion, our study showed a long-term decreasing effect of the COVID-19 declaration of the state of emergency in asthma and COPD patients visits to Showa University Hospital since the beginning of the COVID-19 pandemic compared to the same period in the previous 3 years. The medical care of respiratory diseases that would have been available may not have been provided due to the declaration, so it is necessary to follow up asthma and COPD patients while keeping a close eye on measures other than infectious diseases.

Conclusions

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Conflicts of interest: All authors declare that they have no conflicts of interest.

Author contributions: AM and KM planned this study. YI, YK and AK contributed to improving this study in a meaningful way. AM drafted the manuscript. KM performed data collection. MM supervised data collection. KM supported the draft of this manuscript and data collection. AM contributed to the statistical analysis. AK made substantial contributions to the conception of this study and the revision of the manuscript. All authors read and approved the final manuscript.

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