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BRIEF REPORT
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Early cases of COVID-19 in Tokyo and occupational health

Keisuke Kuwahara[1,2,*], Ai Hori[3], Norio Ohmagari[4], Tetsuya Mizoue[1]

[1] Department of Epidemiology and Prevention, Center for Clinical Sciences, National Center for Global Health and Medicine, Tokyo, Japan;
[2] Teikyo University Graduate School of Public Health, Tokyo, Japan;
[3] University of Tsukuba, Ibaraki, Japan;
[4] AMR Clinical Reference Center, Disease Control and Prevention Center, National Center for Global Health and Medicine, Tokyo, Japan.

Abstract: The coronavirus disease 2019 (COVID-19) has spread rapidly across the globe, presenting severe challenges to societies. Gaining a better understanding of patient demographics is essential to develop measures to counteract such spreading. In this context, from a viewpoint of occupational health, we analyzed the publicly available data on patients diagnosed with COVID-19 in Tokyo, which reported the highest number of cases in Japan. A total of 243 cases aged 20 years or older (excluding students) were recorded between January 14 and March 27, 2020. Of 233 cases excluding 10 cases of the first cluster, 162 were men and 176 were of working age (20 to 69 years). Of 203 cases with valid information on employment status, 151 (74%) were workers: 114 employees, 31 self-employed, and 6 medical staff. Of the working patients, the majority were male: 72% in employed and 87% in self-employed. These data suggest the importance of occupational health in controlling the spread of COVID-19. In April 2020, a state of emergency was declared in response to a surge in the number of cases, especially in metropolitan areas. A working schedule associated with lower risks of infection, including telework and flexible working hours, should be rigorously promoted to minimize human-to-human contact. Such policies, along with the implementation of effective measures to protect essential workers from infection, overwork, and stigma, would ensure the smooth running of society amidst the present crisis.

Keywords: COVID-19, emerging infectious disease, Tokyo, occupational health, infection prevention and control

Introduction

In December 2019, China reported a cluster of pneumonia cases of unknown cause in Wuhan, Hubei (*1*). Patients with this illness, now known as coronavirus disease 2019 (COVID-19), showing a wide range of symptoms such as fever, cough, and shortness of breath (*2*). As of March 31, 2020, World Health Organization announced 750,089 confirmed cases of COVID-19 globally, including 36,405 deaths (*3*).

In Japan, the first case of COVID-19 was reported by the Ministry of Health, Labour and Welfare on January 16, 2020, with the second case on January 24 (*4*). These two cases had visited or come from Wuhan. Then, the number of confirmed cases in Japan has been steadily increasing since the end of January (*5*), adding up to 1,953 cases and 56 deaths as of March 31, (*6*) and 6,656 cases and 171 deaths as of April 20 (*7*). The majority (over 70%) of the patients in Japan, as of March 30, 2020, were aged 20 to 69 years (*8*); the number of cases aged less than 20 years were relatively few (n = 46). In terms of the geographical distribution, the highest number of cases were recorded in Tokyo, which has high population density and mobility, both of which are possible risk factors of transmission (*9,10*).

Considering the important role of Tokyo in national and global economy (*11*), a better understanding of patient characteristics is needed for the implementation of effective infection prevention and control measures. The Tokyo Metropolitan Government has made basic data (*e.g.*, age, sex, residence, characteristics including employment status) of each confirmed case available on its website, uploading in a daily basis. However, to date, a detailed analysis of these basic patient characteristics is not available. In this report, we analyzed the publicly available characteristics of COVID-19 patients from Tokyo. Since the accumulating data suggest that the majority of these patients were of working age, we focused on adults and their employment status and discussed potential strategies to protect workers during the COVID-19 pandemic from the viewpoint of occupational health.

Methods

Study settings

We collected publicly available data on confirmed

Table 1. Characteristics of confirmed cases of COVID-19 in Tokyo between January 14 and March 27, 2020 (*n* = 243)

Characteristics	Employment status (*n* = 203)				Employment status unknown or missing (*n* = 30)	Cases in the first cluster* (*n* = 10)
	Employed† (*n* = 114, 56.2%)	Self-employed (*n* = 31, 15.3%)	Medical staff (*n* = 6, 3.0%)	Non-employed (*n* = 52, 25.6%)		
Age						
20 to 29 years	11 (9.7)	1 (3.2)	1 (16.7)	2 (3.9)	2 (6.7)	0 (0)
30 to 39 years	15 (13.2)	4 (12.9)	1 (16.7)	4 (7.7)	4 (13.3)	1 (10.0)
40 to 49 years	31 (27.2)	10 (32.3)	1 (16.7)	4 (7.7)	6 (20.0)	1 (10.0)
50 to 59 years	29 (25.4)	6 (19.4)	3 (50.0)	3 (5.8)	4 (13.3)	2 (20.0)
60 to 69 years	18 (15.8)	5 (16.1)	0 (0)	10 (19.2)	1 (3.3)	3 (30.0)
70 to 79 years	7 (6.1)	5 (16.1)	0 (0)	16 (30.8)	10 (33.3)	2 (20.0)
80 to 89 years	0 (0)	0 (0)	0 (0)	8 (15.4)	2 (6.7)	1 (10.0)
90 years or older	1 (0.9)	0 (0)	0 (0)	4 (7.7)	1 (3.3)	0 (0)
Missing	2 (1.8)	0 (0)	0 (0)	1 (1.9)	0 (0)	0 (0)
Sex						
Men	82 (71.9)	27 (87.1)	3 (50.0)	24 (46.2)	26 (86.7)	8 (80.0)
Women	32 (28.1)	4 (12.9)	3 (50.0)	28 (53.9)	4 (13.3)	2 (20.0)
Residence						
Tokyo	109 (95.6)	30 (96.8)	5 (83.3)	48 (92.3)	11 (36.7)	0 (0)
Not Tokyo	5 (4.4)	1 (3.3)	1 (16.7)	4 (7.7)	1 (3.3)	0 (0)
Missing	0 (0)	0 (0)	0 (0)	0 (0)	18 (60.0)	10 (100)
Visited abroad	15 (13.2)	2 (6.5)	0 (0)	5 (9.6)	0 (0)	NA
Major symptoms‡						
Fever	103 (90.4)	28 (90.3)	4 (66.7)	41 (78.9)	7 (23.3)	1 (10.0)
Cough	62 (54.4)	20 (64.5)	6 (100)	27 (51.9)	2 (6.7)	1 (10.0)
Fatigue	39 (34.2)	5 (16.1)	0 (0)	12 (23.1)	0 (0)	1 (10.0)
Sore throat	8 (7.0)	2 (6.5)	0 (0)	2 (3.9)	0 (0)	0 (0)

Data are shown as number (%). NA, not available. *One medical staff was classified into this category, not in the category of "medical staff". 5 cases were taxi drivers and one was a worker of the houseboat. †Four executives were included in this category. ‡Persons with missing data on symptoms are included as denominator in each analysis.

cases of COVID-19 in Tokyo, Japan for the present descriptive analysis. Data for the period of January 14 to March 27, 2020 were collected. The source of the data is summarized in Supplementary Table 1. We also referred to a chronological list of patients in Tokyo that provides data on age, sex, and residence (*12*). The present study did not include the cases on the cruise ship "Princess Diamond" (*13*) and airport quarantine. Since we used publicly available anonymous data, ethical approval was not required for this work.

Official consultation process for COVID-19 diagnosis in Tokyo

The Tokyo Metropolitan Government announced the following procedures for patients to be tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) using PCR. If a person who has family physician exhibited common-cold like symptoms, fever, and extreme fatigue or shortness of breath, or anxiety about COVID-19, he/she was advised to consult the family physician by phone. If COVID-19 was suspected, the patient was then referred to a specialized outpatient facility, where PCR testing was performed, if deemed appropriate. For people without a family physician, there were two options available for consultation. Those with common cold-like symptoms, fever, extreme fatigue, and shortness of breath lasting 4 days or more (2 days or more for high-risk individuals) could make a phone call to the consultation desk at a public health center. Then, the patient would be referred to an outpatient facility for PCR testing if necessary. Alternatively, anyone who feels anxious about COVID-19 due to light symptoms could call to the COVID-19 call center. If professional advice was required, he/she would then be referred to the consultation desk at a public health center. Detailed information on the consultation process for COVID-19 diagnosis in Tokyo is available at the official website of the Tokyo Metropolitan Government (*14,15*).

Variables

The age data were binned and reported as age groups (*e.g.*, <10 years, 10s, 20s, and so on). Since the original information on patient characteristics consisted of a mixture of employment status and occupation, we reclassified cases into the following five categories: employed, self-employed, medical staff, non-employed, and unknown or information missing. Company executive (*n* = 4) was classified into the category of employed. Medical staff was treated as a separate category as they are at a higher risk of infection.

For most cases, information on symptoms were concisely summarized; in some cases, the chronological development of symptoms was recorded. For such cases, we extracted information on the symptoms from the narrative description accompanying each case.

Information on close contact was available for the cases reported March 25, 2020 onward. Data on the travel history, particularly of visits abroad, were also extracted. It is to be noted here that definition of abroad (countries and areas) has been changed appreciably over time, based on the expansion of epidemic areas.

Data analysis

We conducted a descriptive analysis of the case characteristics (*e.g.*, age, sex, residence, and travel history, and symptoms) according to the employment status. As data on employment status or job were not available for some cases in the first cluster that occurred in mid-February, we counted this group separately. As a sensitivity analysis, we repeated the main analysis excluding cases resulting from close contact with COVID-19 patients because such cases were identified by active surveillance and may be different from those that were identified by other means.

Results and Discussion

Between January 14 and March 27, 2020, a total of 259 confirmed cases (179 men, 79 women, and 1 unknown) were officially reported in Tokyo, Japan (corresponding to 13.3% of the total COVID-19 case in Japan during that time period). The rate of increase in the cases in Tokyo accelerated after March 4 (see Supplementary Table S1, *https://www.globalhealthmedicine.com/site/supplementaldata.html?ID=4*); 219 cases (84.6%) were reported from that day onward. Of the 259 cases, we excluded 12 patients who were either aged less than 20 years or were students. We further excluded 4 cases: first 3 cases who lived in China and had traveled directly from there; and another case with no data on age, sex, and employment status, leaving a total of 243 adult cases for analysis.

As shown in Table 1, the ten cases were from the first cluster including five taxi drivers, one worker of a houseboat, and one medical staff. Of 233 cases excluding those in the first cluster, 162 (69.5%) were men and 176 (75.5%) were of working age (20 to 69 years). Out of the 203 cases with information on employment status, 151 (74.4%) were workers. Of these, 114 (56.2%) were employed, 31 (15.3%) were self-employed, and 6 (3.0%) were medical staff. The majority of patients with a job were men: 82 (71.9%) of employed and 27 (87.1%) of self-employed, respectively. Twenty-two cases had a recent history of visits abroad; of these, 19 cases were reported after March 21, 2020. The characteristics of 197 cases without close contact to other COVID-19 patients were similar to those in the entire group of adult cases (Supplementary Table S2, *https://www.globalhealthmedicine.com/site/supplementaldata.html?ID=4*).

The present data showed that 74% of adult patients diagnosed with COVID-19 in Tokyo until March 27, 2020 were workers, indicating the importance of occupational health in controlling COVID-19 spread. This figure may reflect the proportion of workers in Tokyo (*11*). Nevertheless, workers in the metropolitan area were expected to have a greater chance of close human contact while working in offices and other settings, commuting to work, and doing activity on leisure; therefore, they were deemed to be at a higher risk of the infection and transmission. According to a nationwide online survey among 24,097,701 LINE users aged 15 years or more conducted in the period ranging from March 31 to April 1, 2020 (*16*), individuals in occupations with high risk of infection (*e.g.*, jobs with difficulties in avoiding crowded or enclosed spaces, or close contact with people) reported having fever more frequently than those in other occupations.

On April 7, 2020, the Government of Japan declared a state of emergency in response to a surge in the number of COVID-19 cases, especially in the metropolitan areas. Meanwhile, the Ministry of Health, Labour and Welfare has requested the bodies of labor and management to promote preventive measures at workplace by showing examples of such measures as well as checklist (*17*), and academic societies have updated practical information on the protection of workers against COVID-19 while continuing business in essential services (*18*). In this context, both employers and employees are expected to rigorously implement multiple measures tailored for each occupation and workplace to ensure that the state of the emergency declared by the government is implemented properly.

Of measures against the spread of COVID-19, remote work can drastically decrease the human-to-human contact associated with work and commuting. Under the current emergency condition, telework is strongly recommended for workers engaging in non-essential service. A survey in March, 2020 reported that 26% of companies introduced telework (*19*), and this figure seems improved in April (*20*). In Tokyo, 99% companies comprise of small- and medium-scale (*11*), which may not have sufficient monetary and human resource to implement these measures against COVID-19. The Ministry of Health, Labour and Welfare (*21*) and the Tokyo Metropolitan Government (*22*) have initiated programs that provide financial and technical supports to encourage teleworking in small and medium enterprises. Such support schemes are expected to ensure an increase in the rate of implementation and popularization of teleworking in Japan during the course of the pandemic.

The present data included only 6 cases of medical staff. After March 27, 2020, large-scale nosocomial infections have been reported in Tokyo (*23-25*). Such outbreaks led higher risks of scaling or shutting down hospital facilities. Thus, it is crucially important to

protect frontline health care workers (*26*). The basic measures include engineering controls (*e.g*., appropriate air-handling system), administrative controls (*e.g*., measures preventing bringing infection from outside, interval regulations for sleep hygiene, and educational [such as hand-hygiene], behavioral, and psychological support), and providing sufficient alcohol-based hand rubs and personal protective equipment (*27*). Additionally, there is an increasing concern about stigma toward health care workers, and this situation should be corrected by improving the public discourse around COVID-19 and educating the public on COVID-19 transmission, prevention, and control (*28*). These measures could be extended to workers in government sectors responsible for the response to COVID-19 and those in essential services (*e.g*., energy, emergency services, food and agriculture, water, transportation and logistics, communication and information technology, schools, financial services, *etc*.).

In the present dataset, 19 of the 22 cases with a travel history of visits abroad were reported in late March, consistent with the global surge in infected patients during this month. This might be attributed to both business trips and sightseeing during the spring vacation. As of March 31, the Ministry of Foreign Affairs urged Japanese nationals to avoid all travel to 73 countries and regions and advised to avoid non-essential travel for the rest of the world (*29*) and the Ministry of Health, Labour and Welfare requested all individuals returning from overseas should stay at a designated place (*e.g*., home) for 14 days (*30*). On April 24, the Ministry of Foreign Affairs further raised the travel alert in 14 countries. Careful follow-up of such updated restrictions on overseas travel is required to protect workers and our society against the forthcoming third and fourth waves of COVID-19 from overseas epicenter.

In conclusion, three-quarters of the adult COVID-19 cases in Tokyo till March 27, 2020, comprised of workers, suggesting the importance of implementing occupational health measures in protecting the national and global socioeconomic scenario from ramifications of COVID-19. Given the rapidly increasing number of infected cases in both Tokyo and other prefectures, more rigorous measures should be adopted to protect essential workers against COVID-19 infection, overwork, and stigma. This, along with the implementation of a work style, including teleworking and stay at home policies, ensuring lower risks of infection for people with other occupations, would ensure the smooth progression of society during these challenging times.

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**Address correspondence to*:
Keisuke Kuwahara, Teikyo University Graduate School of Public Health, 2-11-1 Kaga, Itabashi-ku, Tokyo, 173-8605, Japan.
Email: kkuwahara@med.teikyo-u.ac.jp