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Note

Risk factors associated with hospitalization in patients with asymptomatic or mild COVID-19 in public accommodation facilities in Tokyo

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ABSTRACT

Introduction: In Japan, patients with coronavirus disease 2019 (COVID-19) who do not require medical intervention are provided care in recovery accommodation facilities (RAFs). However, some patients may require hospitalization if their symptoms become more severe during their stay. We conducted an observational study using epidemiological data of patients with COVID-19 admitted to RAFs in Tokyo.

Methods: This was an observational cohort study using data from COVID-19 patients admitted to one of the RAFs in Tokyo from December 2020 to November 2021. Admissions to the facilities were limited to patients with asymptomatic or mild COVID-19 with no underlying disease or at least stable underlying disease at the time of admission. Patients were hospitalized when they required oxygen administration or when they had, or persistent fever, or severe respiratory symptoms. We evaluated the association between hospitalization and the risk factors for hospitalization using a Cox regression model.

Results: The number of patients with COVID-19 admitted to the RAF was 6176. The number of hospitalized patients was 393 (6.4%), and the median length of stay was 5.50 days (IQR: 4.50, 6.50). In the Cox regression analysis, the hazard ratio increased with age and was significantly higher among patients aged >60 years (HR = 10.23, 95% CI: 6.72–15.57) than those in other age groups. This trend is similar to that observed in the sensitivity analysis.

Conclusion: Patients with diabetes, the elderly, obesity, and medications for gout and psychiatric diseases may be at a high risk of hospitalization. In particular, an age over 60 years was strongly associated with hospitalization.

The global coronavirus disease 2019 (COVID-19) pandemic, which is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), continues into 2022. In Japan, the first case was reported in January 2020, and as of April 13, 2022, the cumulative number of infected individuals has exceeded 7 million and has not been controlled. In addition, at the peak of the pandemic, there was a shortage of hospital beds [1,2]. To address this issue, patients with asymptomatic and mild COVID-19 have been provided care for in the recovery accommodation facilities (RAFs) using hotels in Japan since April 2020 to secure the number of hospital beds and allocate medical resources appropriately. The RAFs are operated by local governments using private accommodations. Although the RAFs have medical staff on site, they do not provide aggressive medical practices such as taking blood samples, performing x-rays, or prescribing drugs. If a patient's condition worsens during their stay at the RAF and a physician determines that medical intervention in a hospital is necessary, such as in the case of respiratory failure requiring oxygen administration or dehydration requiring intravenous treatment, they will be transported to a hospital in Tokyo. However, if a succession of patients in deteriorated conditions occurs, the workload of the RAF staff and regional public health office staff increases, as they have to respond to sudden changes in patients loads and search for hospitals to transport the patients to [2]. Identifying the risk factors associated with hospitalization in patients with asymptomatic or mild COVID-19 admitted to RAFs and experience a deterioration

Abbreviations: COVID-19, coronavirus disease 2019; RAFs, the recovery accommodation facilities (RAFs); SARS-CoV-2, severe acute respiratory syndrome coronavirus-2.

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of health will help in the smooth operation of RAFs.

To clarify the risk of severe disease in patients with COVID-19 in Japan, a large-scale epidemiological study using the registry of hospitalized patients with COVID-19 called the "COVID-19 REGISTRY JAPAN (COVIREGI-JP)" was conducted [3]. This registry revealed that those with chronic kidney disease, chronic respiratory disease, liver disease, obesity (body mass index [BMI] > 30), diabetes, cardiovascular disease, hypertension, solid tumors, and dyslipidemia were at a higher risk of severe COVID-19 [4]. However, the COVIREGI-JP is an epidemiological study of inpatients with COVID-19, and its background is different from that of patients in RAFs. Thus far, there is a lack of information on the course and prognosis of patients with asymptomatic and mild COVID-19 receiving care in RAFs. It is essential to clarify the clinical course of COVID-19 in patients admitted to RAFs and to analyze the risk factors for hospitalization to allocate appropriate medical resources to patients with asymptomatic or mild COVID-19.

We conducted an observational study using epidemiological data from patients with COVID-19 admitted to the RAF in Nishi-Shinjuku, Tokyo, administered by the Tokyo Metropolitan Government (TMG). The RAF in Nishi-Shinjuku is one of the largest and earliest operating RAFs managed by TMG. This study aimed to clarify the clinical course of asymptomatic and/or mild COVID-19 and identify the risk factors associated with the disease progression of COVID-19 among patients in RAFs.

This study was an observational cohort study from December 2020 to November 2021.

The criteria for admission to the RAF were as follows [2]:

1. Patients with COVID-19 confirmed by polymerase chain reaction (PCR) or the antigen test.
2. Patients with asymptomatic or mild COVID-19 (oxygen saturation ≥96% without oxygenation, no respiratory symptoms, or only cough with no dyspnea) who were judged to be eligible for admission to the RAF.

However, the following patients were not admitted to RAFs and were instead treated in hospitals.

1. 70 years old or older
2. Uncontrolled underlying diseases (diabetes, heart disease, respiratory disease, or chronic kidney disease requiring dialysis). However, if the physician judged that the condition was under control, the patient was admitted.
3. Immunosuppressed condition.
4. Pregnant women.
5. Patients who need to eliminate allergic sources in their diet.

The isolation period in RAFs for symptomatic patients with COVID-19 was at least ten days after the onset of symptoms and, 48 h after the resolution of fever or improvement of symptoms, and ten days after positive SARS-CoV-2 PCR for asymptomatic patients. Patients were hospitalized from the RAFs if they met any of the following criteria: 1) persistent hypoxia (oxygen saturation of 93% or lower in ambient air), 2) respiratory failure or severe respiratory symptoms, or 3) physician in RAFs determined that hospitalization was necessary [5,6].

Data were collected from electronic medical records. In this study, we collected basic patient information (date of admission, date of discharge, date of onset, sex, age, smoking history, BMI and vaccination history), comorbidities, regular medications upon admission (excluding newly prescribed medicines for COVID-19), outcomes upon discharge, and reasons for discharge. We used the data obtained by excluding patients admitted to the RAFs with a negative SARS-CoV-2 PCR test result (e.g., parents who intended to accompany their children).

Continuous variables were presented as the median and interquartile range (IQR), and categorical variables were presented as the number of cases and percentage. Absent was imputed ten times using multivariate imputation by chained equations. The results were summarized using Rubin's rules. Kaplan–Meier survival analysis and Cox regression were performed to quantify the risk of severity outcomes with COVID-19 by considering hospitalization as the event and the length of admission to the RAF as the event time. Age, sex, smoking status, BMI, vaccination history for COVID-19, comorbidities (diabetes, high blood pressure, hyperlipidemia, chronic heart disease, chronic lung disease, and chronic liver disease), and medications were included as the variables. Comorbidities were assessed through interviews and regular medications administration upon admission. Gout and psychiatric disorders were not included in the questionnaire; however morbidity was determined based on the medication history. To account for the differences in the SARS-CoV-2 variants by epidemic period, we categorized the time of admission to RAFs into three periods: November 2020 to March 2021 (the original strain), April 2021 to June 2021 (the alpha strain), and July 2021 to November 2021 (the delta strain) [7]. Age was categorized as less than 39 years, 40–49 years, 50–59 years, and 60 years and above; BMI was categorized as less than 18, 18 to 24.9, 25 to 29.9, and 30 and above. Two sensitivity analyses were performed. The first was performed for each period for patients under 65 years. The second was performed using the length of time from the onset of symptoms or the length of stay in the RAF. Differences were considered statistically significant at $P \leq 0.05$. This study used the programming language R ver.4.1.2 (R Core Team, 2020) for all analyses. This study was approved by the institutional ethics board of the Jikei University School of Medicine (No. 33–492(11122)).

The number of patients with COVID-19 admitted to the RAFs between December 2020 and November 2021 was 6176. Table 1 shows the demographic characteristics of all of the patients admitted to the RAFs. The median age was 32.0 years (IQR: 23.0, 45.0), and there were 3683 males (59.6%). The number of patients with comorbidities was 804 (13.0%). The number of hospitalized patients was 393 (6.4%), and the median length of stay was 5.50 days (IQR: 4.50, 6.50).

The Kaplan–Meier curve demonstrates that the number at risk was 138, and the survival probability without hospitalization was 0.917 at ten days after admission (Fig. 1). In the Cox regression analysis with hospitalization as the outcome, the hazard ratio (HR) increased with age and was significantly higher among patients aged more than 60 years (HR = 10.23, 95% confidence interval [CI]: 6.72–15.57) than that in the other age groups. This trend was similar to that observed in the sensitivity analysis (data not shown). Male sex, an unvaccinated status, and presence of diabetes and obesity were also associated with hospitalization. Patients with gout medication (HR = 2.79, 95% CI: 1.33–5.84) and psychiatric medication, such as antipsychotics and anxiolytics (HR = 3.28, 95% CI: 1.50–7.21), were also associated with hospitalization (Table 2).Sensitivity analysis showed that these results did not differ when using the length of time from the onset of symptoms or the length of stay in the RAFs.

This study analyzed 6176 patients admitted to the RAF for asymptomatic or mild COVID-19. We observed that an advanced age, male sex, vaccination, diabetes, obesity, and the use of gout and psychiatric medication were associated with hospitalization from the RAF.

Among the severity factors shown in this study, an older age, diabetes, and obesity have been identified as severity factors for COVID-19 in previous studies [3]. However, the factor of age in our study showed a robust association with hospitalizations. This association was observed throughout the study period. COVID-19 is associated with a high mortality rate in the elderly population. Our results are consistent with this phenomenon. The results for patients aged over 65 years showed the same results. Although there may be a shortage of hospital beds, the criteria for admitting patients aged over 65 years may need to be reconsidered. Patients aged over 60 years should be monitored more carefully, even if they are asymptomatic or mild.

Although medications for gout and psychiatric diseases were observed to be associated with hospitalization, we could not determine the risks associated with these medications. Antidepressant use is

Table 1
Demographic characteristics of all patients admitted to the recovery accommodation facilities.

	Overall	Period			
		November 2020–March 2021	April 2021–May 2021	June 2021–July 2021	November 2021
	n = 6176	n = 1784	n = 1451	n = 1412	n = 1529
Transfer to Hospital	393 (6.4)	90 (5.0)	83 (5.7)	134 (9.5)	86 (5.6)
Severity					
Asymptomatic cases	587 (9.5)	202 (11.3)	183 (12.6)	104 (7.4)	98 (6.4)
Mild cases	5589 (90.5)	1582 (88.7)	1268 (87.4)	1308 (92.6)	1431 (93.6)
Follow up time (days)	6.50 (4.50, 7.50]	5.50 (4.50, 6.50]	6.50 (5.50, 7.50]	6.50 (4.50, 7.50]	5.50 [4.50, 7.50]
Age					
≤39 years	3966 (64.2)	1069 (59.9)	954 (65.7)	911 (64.5)	1032 (67.5)
40–49 years	1083 (17.5)	308 (17.3)	227 (15.6)	253 (17.9)	295 (19.3)
50–59 years	897 (14.5)	316 (17.7)	212 (14.6)	201 (14.2)	168 (11.0)
≥60 years	230 (3.7)	91 (5.1)	58 (4.0)	47 (3.3)	34 (2.2)
Male	3683 (59.6)	1055 (59.1)	838 (57.8)	844 (59.8)	946 (61.9)
BMI					
<18.5 kg/m^2	689 (11.2)	1173 (65.8)	976 (67.3)	971 (68.8)	1024 (67.0)
18.5–25.0 kg/m^2	4144 (67.1)	193 (10.8)	157 (10.8)	163 (11.5)	176 (11.5)
25.0–30.0 kg/m^2	1070 (17.3)	329 (18.5)	255 (17.6)	237 (16.8)	249 (16.3)
≥30.0 kg/m^2	270 (4.4)	88 (4.9)	62 (4.3)	41 (2.9)	79 (5.2)
Smoker	2403 (39.0)	715 (40.2)	546 (37.8)	540 (38.2)	602 (39.4)
Unvaccinated	4722 (91.4)	1784 (100)	1047 (99.9)	724 (88.2)	1167 (77.0)
Comorbidity					
Hypertension	277 (4.5)	111 (6.2)	70 (4.8)	54 (3.8)	42 (2.7)
Dyslipidaemia	163 (2.6)	73 (4.1)	29 (2.0)	40 (2.8)	21 (1.4)
Diabetes	98 (1.6)	44 (2.5)	15 (1.0)	16 (1.1)	23 (1.5)
Heart Disease	59 (1.0)	25 (1.4)	10 (0.7)	13 (0.9)	11 (0.7)
Chronic Obstructive Pulmonary Disease	322 (5.2)	92 (5.2)	91 (6.3)	58 (4.1)	81 (5.3)
Liver Disease	16 (0.3)	8 (0.4)	1 (0.1)	3 (0.2)	4 (0.3)
Regular medications upon admission					
Psycholeptics	27 (0.4)	8 (0.4)	12 (0.8)	6 (0.4)	1 (0.1)
Antigout Preparations	28 (0.5)	10 (0.6)	10 (0.7)	6 (0.4)	2 (0.1)

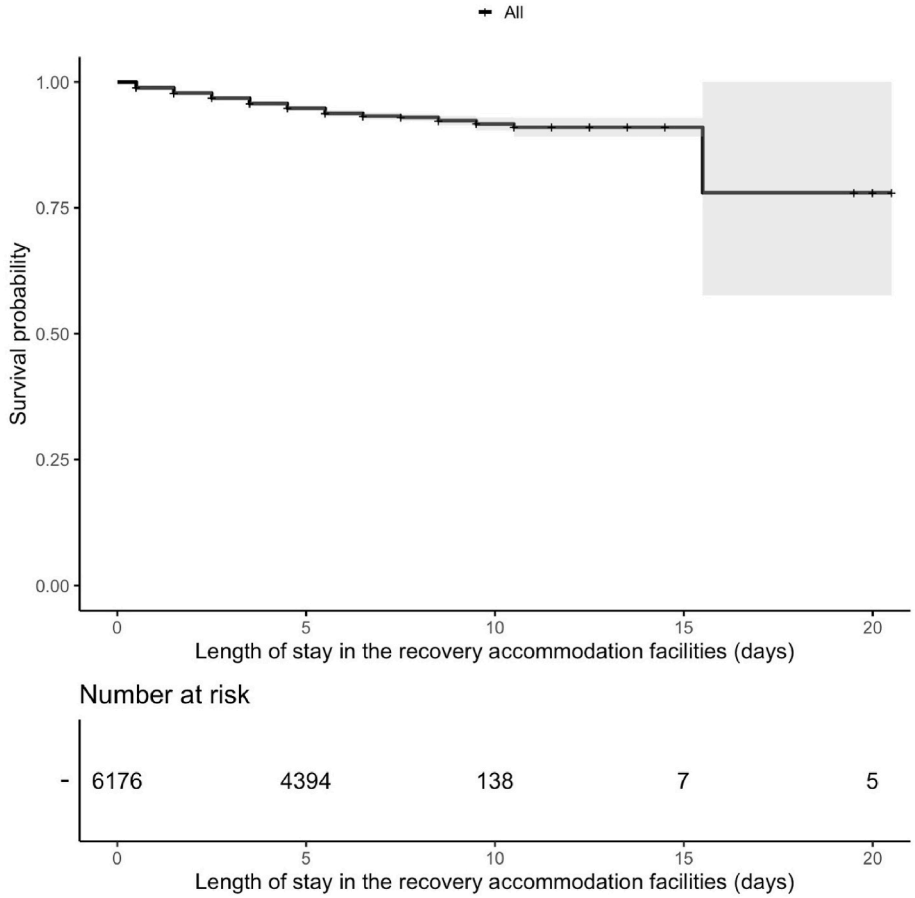

Fig. 1. Probability of stay in the recovery accommodation facilities in Tokyo from December 2020 to November 2021.

Table 2
Associations between clinical features and hospitalization in Cox regression model.

	Hazard Ratio	(95% Confidence Intervals)			
Period					
November 2020–March 2021	Ref				
April 2021–May 2021	0.77	(0.52	–	1.14	)
June 2021–July 2021	2.11	(1.50	–	2.98	)
August 2021–November 2021	1.92	(1.39	–	2.66	)
Age			–		
≤39	Ref		–		
40–49	2.24	(1.57	–	3.19	)
50–59	5.07	(3.67	–	7.00	)
≥60	10.23	(6.72	–	15.57	)
Male	1.81	(1.35	–	2.42	)
BMI			–		
<18.5	0.79	(0.43	–	1.45	)
18.5–25.0	Ref		–		
25.0–30.0	1.69	(1.28	–	2.24	)
≥30.0	1.81	(1.15	–	2.83	)
Smoker	1.17	(0.91	–	1.51	)
Unvaccinated	1.80	(1.14	–	2.85	)
Comorbidity			–		
Hypertension	1.27	(0.87	–	1.86	)
Dyslipidaemia	1.18	(0.75	–	1.88	)
Diabetes	1.95	(1.20	–	3.18	)
Heart Disease	0.74	(0.29	–	1.88	)
Chronic Obstructive Pulmonary Disease	1.27	(0.78	–	2.07	)
Liver Disease	2.32	(0.56	–	9.58	)
Regular medications upon admission			–		
Psycholeptics	3.28	(1.50	–	7.21	)
Antigout medications	2.79	(1.33	–	5.84	)

associated with a reduced risk of intubation or death [8]. However, pre-existing mental disorders and exposure to antipsychotics and anxiolytics were associated with COVID-19 mortality in both crude and adjusted models [9].At present, the effect of these drugs have on the pathogenesis of COVID-19 is unclear.

This study had several limitations. The first is the use of data from before the Omicron epidemic. There were considerable differences in the severity of disease between the Omicron strain and earlier strains. In the future, it will be necessary to include data from the Omicron epidemic period and examine the differences in severity factors between Omicron strains and other strains, such as the Delta strain. Second, the data used in this study were obtained from a single RAF. In addition to the RAF in Nishi-Shinjuku, several other RAFs are in operation, but not all of them are managed in a unified format, and it is necessary to integrate them and accumulate more data in the future.

It was assumed that patients admitted to the RAFs in Japan were asymptomatic, had mild COVID-19 without underlying diseases, or had well-controlled underlying disorders. However, even if the comorbidities are controlled, patients with diabetes, the elderly, obesity, medications for gout and psychiatric diseases may be at a high risk of hospitalization. In particular, an age over60 years was strongly associated with hospitalization. Particular attention should be paid to their health care in the RAFs.

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Authorship

All persons who meet the authorship criteria are listed as authors, and all authors certify that they have participated sufficiently in the work to publicly take responsibility for the content, including participation in the concept, design, analysis, writing, or revision of the manuscript. Furthermore, each author certifies that this material or similar material has not been and will not be submitted to or published in any other publication before its appearance in the *Journal of Infection and Chemotherapy*.

YS, KS, TT, TY, and TI were involved in the study design, data interpretation and data analysis. TM, KS, MM, KN, TH, TH, YN, and MY were involved in the data acquisition. All authors critically revised the report, commented on the drafts of the manuscript, and approved the final report.

Declaration of competing interest

None.

The endpoint was hospitalization. The number at risk was 138 and the survival probability without hospitalization at ten days after admission to the recovery accommodation facilities was 0.917. The shaded areas represent the lower and upper 95% confidence intervals.

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Appendix 1

Sensitivity analysis assessing the association of age and epidemic period.

Age	November 2020–March 2021		April 2021–May 2021		June 2021–July 2021		August 2021- November 2021	
	Hazard Ratio	*P* value	Hazard Ratio	*P* value	Hazard Ratio	*P* value	Hazard Ratio	*P* value
≤39	Ref		Ref		Ref		Ref	
40–49	2.466	0.018	1.758	0.207	2.093	0.049	2.153	0.009
50–59	5.722	0.000	3.132	0.001	4.179	0.000	5.452	0.000
≥60	9.566	0.000	5.514	0.000	15.487	0.000	15.685	0.000

Appendix 2

The comparison of Cox regression model and Logistic regression model.

	Cox regression model					Logistic regression model				
	Hazard Ratio	(95% Confidence Intervals)				Hazard Ratio	(95% Confidence Intervals)			
Period										
November 2020–March 2021	Ref	Ref				Ref	Ref			
April 2021–May 2021	0.77	(0.77	–	1.14	)	0.78	(0.51	–	1.19	)
June 2021–July 2021	2.11	(2.11	–	2.98	)	2.43	(1.67	–	3.53	)
August 2021–November 2021	1.92	(1.92	–	2.66	)	2.03	(1.43	–	2.87	)
Age			–					–		
≤39	Ref	Ref	–			Ref	Ref	–		
40–49	2.24	(2.24	–	3.19	)	2.30	(1.60	–	3.32	)
50–59	5.07	(5.07	–	7.00	)	5.55	(3.94	–	7.81	)
≥60	10.23	(10.23	–	15.57	)	11.80	(7.42	–	18.75	)
Male	1.81	(1.81	–	2.42	)	1.85	(1.35	–	2.53	)
BMI			–					–		
<18.5	0.79	(0.79	–	1.45	)	0.77	(0.42	–	1.43	)
18.5–25.0	Ref	Ref	–			Ref	Ref	–		
25.0–30.0	1.69	(1.69	–	2.24	)	1.80	(1.33	–	2.43	)
≥30.0	1.81	(1.81	–	2.83	)	2.09	(1.27	–	3.42	)
Smoker	1.17	(1.17	–	1.51	)	1.17	(0.89	–	1.53	)
Unvaccinated	1.80	(1.80	–	2.85	)	1.90	(1.17	–	3.09	)
Comorbidity			–					–		
Hypertension	1.27	(1.27	–	1.86	)	1.37	(0.88	–	2.11	)
Dyslipidaemia	1.18	(1.18	–	1.88	)	1.29	(0.76	–	2.19	)
Diabetes	1.95	(1.95	–	3.18	)	2.08	(1.16	–	3.73	)
Heart Disease	0.74	(0.74	–	1.88	)	0.70	(0.23	–	2.11	)
Chronic Obstructive Pulmonary Disease	1.27	(1.27	–	2.07	)	1.31	(0.77	–	2.22	)
Liver Disease	2.32	(2.32	–	9.58	)	2.45	(0.49	–	12.35	)
Regular medications upon admission			–					–		
Psycholeptics	3.28	(3.28	–	7.21	)	5.75	(2.04	–	16.25	)
Antigout medications	2.79	(2.79	–	5.84	)	4.40	(1.66	–	11.68	)

Appendix 3

Appendix 3

Sensitivity analysis comparing use of the reported onset date or use of the facility admission date

	Use of the length of time from the onset of symptoms						Use of the length of stay in the RAF					
	Hazard Ratio	(95% Confidence Intervals)	Hazard Ratio	(95% Confidence Intervals)								
Period												
November 2020–March 2021	Ref						Ref					
April 2021–May 2021	0.77	(	0.52	–	1.14	)	0.77	(	0.52	–	1.14	)
June 2021–July 2021	2.11	(	1.50	–	2.98	)	2.20	(	1.57	–	3.10	)
August 2021–November 2021	1.92	(	1.39	–	2.66	)	1.81	(	1.31	–	2.51	)
Age				–						–		
≤39	Ref			–			Ref			–		
40–49	2.24	(	1.57	–	3.19	)	2.19	(	1.54	–	3.12	)
50–59	5.07	(	3.67	–	7.00	)	4.80	(	3.47	–	6.64	)
≥60	10.23	(	6.72	–	15.57	)	9.10	(	5.98	–	13.85	)
Male	1.81	(	1.35	–	2.42	)	1.75	(	1.35	–	2.34	)
BMI				–						–		
<18.5	0.79	(	0.43	–	1.45	)	0.79	(	0.43	–	1.44	)
18.5–25.0	Ref			–			Ref			–		
25.0–30.0	1.69	(	1.28	–	2.24	)	1.71	(	1.29	–	2.26	)
≥30.0	1.81	(	1.15	–	2.83	)	1.99	(	1.29	–	3.09	)
Smoker	1.17	(	0.91	–	1.51	)	1.17	(	0.91	–	1.50	)
Unvaccinated	1.80	(	1.14	–	2.85	)	1.87	(	1.17	–	2.97	)
Comorbidity				–						–		
Hypertension	1.27	(	0.87	–	1.86	)	1.35	(	0.94	–	1.96	)
Dyslipidaemia	1.18	(	0.75	–	1.88	)	1.22	(	0.78	–	1.92	)
Diabetes	1.95	(	1.20	–	3.18	)	1.94	(	1.19	–	3.15	)
Heart Disease	0.74	(	0.29	–	1.88	)	0.97	(	0.39	–	2.41	)
Chronic Obstructive Pulmonary Disease	1.27	(	0.78	–	2.07	)	1.21	(	0.74	–	1.97	)
Liver Disease	2.32	(	0.56	–	9.58	)	2.00	(	0.49	–	8.20	)
Regular medications upon admission				–						–		
Psycholeptics	3.28	(	1.50	–	7.21	)	3.33	(	1.51	–	7.34	)
Antigout medications	2.79	(	1.33	–	5.84	)	3.04	(	1.49	–	6.20	)

References

[1] Pacific WHOROftW. COVID-19 situation report for the western pacific region #90: 26 January 2022 - 1 February 2022. 2022. https://www.mhlw.go.jp/stf/seisakunitsuite/newpage_00023.htm.

[2] Bureau of Social Welfare and Public Health TMG. Recovering at a designated hotel. 2021. https://www.fukushihoken.metro.tokyo.lg.jp/english/health-crisis/covid19hotel.html.

[3] Matsunaga N, Hayakawa K, Terada M, Ohtsu H, Asai Y, Tsuzuki S, et al. Clinical epidemiology of hospitalized patients with coronavirus disease 2019 (COVID-19) in Japan: report of the COVID-19 registry Japan. Clin Infect Dis : Off Publ Infect Dis Soc Am 2021 Dec 6;73(11):e3677–89.

[4] Terada M, Ohtsu H, Saito S, Hayakawa K, Tsuzuki S, Asai Y, et al. Risk factors for severity on admission and the disease progression during hospitalisation in a large cohort of patients with COVID-19 in Japan. BMJ Open 2021 Jun 15;11(6):e047007.

[5] Yamakawa K, Yamamoto R, Terayama T, Hashimoto H, Ishihara T, Ishimaru G, et al. Japanese rapid/living recommendations on drug management for COVID-19: updated guidelines (September 2021). Acute Med Surg 2021;8(1):e706.

[6] The Ministry of Health L, Welfare in Japan. Clinical management of patients with COVID-19: a guide for Front-line healthcare workers. 2022. https://www.mhlw.go.jp/content/000904136.pdf.

[7] The Ministry of Health L, inJapan Welfare. https://www.mhlw.go.jp/stf/seisakunitsuite/newpage_00061.html.

[8] Hoertel N, Sánchez-Rico M, Vernet R, Beeker N, Jannot A-S, Neuraz A, et al. Association between antidepressant use and reduced risk of intubation or death in hospitalized patients with COVID-19: results from an observational study. Mol Psychiatr 2021;26(9):5199–212.

[9] Vai B, Mazza MG, Delli Colli C, Foiselle M, Allen B, Benedetti F, et al. Mental disorders and risk of COVID-19-related mortality, hospitalisation, and intensive care unit admission: a systematic review and meta-analysis. Lancet Psychiatr 2021;8(9):797–812.