Increasing burden of nursing care on the treatment of COVID-19 patients in the ageing society: analyses during the first to the third wave of pandemic in Kyoto City, Japan

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Abstract

Background

The coronavirus disease 2019 (COVID-19) pandemic is associated with a heavy burden on patients' mental and physical health, regional healthcare resources, and global economic activity. An ageing society such as Japan has many retirement homes and long-term stay hospitals for the elderly and their inhabitants. During the COVID-19 pandemic, disease clusters are often identified in retirement homes and long-term stay hospitals. Although we hypothesize that additional burdens of nursing care for elderly patients will reinforce the anxiety and exhaustion of medical staff and healthcare resources in the ageing society, the actual situation is not well understood. In this study, we aimed to evaluate the current situation and countermeasures of the COVID-19 pandemic in the ageing society.

Methods

We reviewed COVID-19 patients who required hospitalization at the National Hospital Organization Kyoto Medical Center, a 600-bed capacity hospital located in Kyoto, Japan, between 1 April 2020 and 31 March 2021. We assessed the characteristics of the COVID-19 patients, disease severity, duration of hospitalization, outcome at discharge, degree of activities of daily living (ADLs), and complications unique to elderly patients.

Results

We enrolled 118 patients who required hospitalization during the study period. Approximately 40% of the patients were aged ≥ 80 years. Dementia (27.1%) was the most prevalent underlying disease, followed by diabetes mellitus (23.7%) and chronic kidney disease (23.7%). Approximately 60% of hospitalized COVID-19 patients had impaired ADL at admission. The COVID-19 patients aged 80 years or older required significantly more longer-term hospitalization than the COVID-19 patients aged under 80 years (15.5 ± 8.2 vs. 13.1 ± 7.7 , $P = 0.032$). In elderly patients aged 80 years or older, approximately 50% of patients had geriatric mental disorders, and approximately 70% had bedridden status and feeding difficulty.

Conclusions

The proportion of elderly patients aged 80 years or older was relatively high during the hospitalization for COVID-19. We should keep in mind that healthcare workers are forced to have an additional burden of nursing care in the ageing society during the COVID-19 pandemic. Therefore, interventions to reduce the burden are urgently required.

Background

Coronavirus disease 2019 (COVID-19) is caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). COVID-19 was first identified in Wuhan, China, in December 2019. The outbreak of COVID-19 had rapidly spread worldwide, and the World Health Organization declared a pandemic on 11 March 2020. [1] The clinical course of COVID-19 is mild and self-limiting upper respiratory infection symptoms in young healthy subjects; however, severe respiratory failure is often observed in elderly patients with chronic diseases. [2, 3] The COVID-19 pandemic is associated with a heavy burden on patients' mental and physical health, regional healthcare resources, and global economic activity. As is well known, Japan is facing the most ageing society worldwide. [4] There are many retirement homes and long-term stay hospitals for the elderly and their inhabitants in Japan. During the COVID-19 pandemic, disease clusters are often identified in retirement homes and long-term stay hospitals. [5] Elderly patients with chronic diseases had been mainly affected by the COVID-19 pandemic between the first and third waves of the pandemic in Japan. A recent study has shown that clinicians and clinical teams for COVID-19 patient care had struggled with the complexity of providing high-quality care because of the following difficulties: crisis capacity, resource limitation, and multiple unprecedented barriers to care delivery. [6, 7] In addition, healthcare workers had a higher prevalence of stress, anxiety, depression, and psychological distress than the general population during the COVID-19 pandemic. [8]

We hypothesize that additional burdens of nursing care for elderly patients will reinforce the anxiety and exhaustion of medical staff and healthcare resources in the ageing society such as Japan.

In this study, we aimed to evaluate the current situation and countermeasures of the COVID-19 pandemic in the ageing society.

Patients And Methods

We reviewed COVID-19 patients who required hospitalization at the National Hospital Organization Kyoto Medical Center, a 600-bed capacity hospital located in Kyoto, Japan, between 1 April 2020 and 31 March 2021. During this period, Japan experienced several major outbreaks of COVID-19: the first, second, and third waves of the pandemic. During this pandemic, most tertiary medical centres or hospitals in Kyoto City have accepted mild to severe COVID-19 patients. All COVID-19 patients admitted to our hospital were diagnosed by SARS-CoV-2 PCR tests. Because COVID-19 was designated as a specific infectious disease in Japan, all COVID-19 patients were hospitalized according to the recommendation of public authorities and treated by publicly funded health care. To avoid this concentration, COVID-19 patients living in Kyoto City were assigned to suitable hospitals by the public authorities. The population ageing rate of Kyoto City increased to 28.0% in 2019, indicating that 1 out of 3.5 people living in Kyoto City was an elderly aged 65 years or older. [9] We assessed the characteristics of COVID-19 patients, disease severity, duration of hospitalization, outcome at discharge, degree of activities of daily living (ADLs), and complications unique to elderly patients. Disease severity was defined as mild, moderate, or severe according to the Japanese COVID-19 treatment guidelines published by the Japanese Ministry of Health, Labour and Welfare. [5] COVID-19 Registry Japan (COVIREGI-JP) of National Center for Global Health and Medicine were used for this study with permission. The study data were collected and managed using

REDCap (Research Electronic Data Capture) a secure, web-based data capture application hosted at JCRAC data center of National Center for Global Health and Medicine.

Statistics Analyses

Statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS) version 26 (International Business Machines Corporation SPSS, Chicago, IL, USA). The Wilcoxon rank-sum test was used to compare the duration of hospitalization between the two groups.

Results

We enrolled 118 patients who required hospitalization during the study period. The characteristics of COVID-19 patients hospitalized in our hospital are shown in Table 1. Patients' mean age was 71.3 ± 17.4 years. The female-to-male ratio was roughly half and half. Approximately 40% of the patients were aged ≥ 80 years. Dementia (27.1%) was the most prevalent underlying disease, followed by diabetes mellitus (23.7%) and chronic kidney disease (23.7%). The ADLs of the COVID-19 patients are shown in Table 1. Approximately 60% of hospitalized COVID-19 patients had impaired ADLs at admission. Figure 1 shows age-specific COVID-19 disease severity. Hospitalization was most commonly needed in the elderly in their 70s, followed by the 80s and 60s. Most patients in their 20s and 30s had mild disease, whereas the majority of patients in their 40s, 50s, and 60s had moderate disease. Furthermore, the vast majority ($\leq 80\%$) of patients aged ≥ 70 years had moderate and severe diseases. Figure 2 shows the outcomes of COVID-19 patients at discharge. The COVID-19 mortality rate at our hospital was 11%. All but one patient was in their 70s to 90s. Figure 3 shows the duration of the hospitalization. COVID-19 patients aged 80 years or older required significantly more longer-term hospitalization than the COVID-19 patients aged under 80 years (15.5 ± 8.2 vs. 13.1 ± 7.7 , $P = 0.032$). Table 2 shows the complications unique to elderly patients in the COVID-19 care unit. In all patients, approximately 40% had a bedridden status and feeding difficulty. For elderly patients aged 80 years or older, approximately 50% of patients had geriatric mental disorder, and approximately 70% had bedridden status and feeding difficulty.

Table 1
Characteristics of the coronavirus disease 2019 patients

Characteristics	N = 118
Age, years	71.3 ± 17.4
Sex (female)	61 (51.7)
Elderly patients (aged ≤ 80 years)	46 (39.0)
Underlying diseases	
Cardiovascular diseases	22 (18.6)
Cerebrovascular diseases	12 (10.2)
Dementia	32 (27.1)
Diabetes mellitus	28 (23.7)
Chronic pulmonary disease	17 (14.4)
Chronic kidney disease	28 (23.7)
Malignant disease	13 (11.0)
Use of immunosuppressants	8 (6.8)
Use of biologic agents	1 (0.85)
Duration of hospitalization, days	14.1 ± 8.0
Activities of daily livings	
Total independence	48 (40.7)
Partial independence	41 (34.7)
Total dependence	29 (24.6)
Data were shown as mean ± standard deviation or number (%).	

Table 2
Complications unique to elderly patients

Complications	All patients	Patients aged 80 years or older
	N = 118	N = 47
Bedridden status	46 (39.0)	31 (66.0)
Feeding difficulty	52 (44.1)	34 (72.3)
Enteral alimentation	19 (16.1)	11 (23.4)
Fluid replacement	33 (28.0)	23 (48.9)
Disquiet/delirium	38 (32.2)	26 (55.3)
Dementia/communication difficulty	40 (33.9)	24 (51.1)
Need continuous sputum suction	27 (22.9)	18 (38.3)
Data were shown as number (%).		

Discussion

In our hospital, almost 40% of hospitalized COVID-19 patients were aged 80 years or older. We found that 30–40% of COVID-19 patients in our hospital experienced complications unique to elderly patients. According to the Japanese government statement, elderly patients aged 80 years or older accounted for 10–15% of hospitalized COVID-19 patients in Japan. [5] Our hospital had accepted approximately three times higher percentage of elderly COVID-19 patients than the average of other hospitals in Japan. This might be caused by the COVID-19 clusters that occurred in nearby retirement homes and long-term stay hospitals.

Notably, we revealed that only 40% of the COVID-19 patients in our hospital could maintain their ADLs of total independence at admission. The remaining 60% of the patients had impaired ADLs. Approximately 30–40% of all hospitalized patients have some forms of complications unique to elderly patients. In patients aged 80 years or older, the rate of these complications increased by 50–70%. These facts clearly indicate that healthcare workers belonging to COVID-19 care units had a considerable burden of nursing care from the early stages of hospitalization. Furthermore, because our study revealed that elderly patients aged 80 years or older had a significantly longer duration of hospitalization, this situation would exacerbate the bed turnover rate and result in additional physical and mental burden in healthcare workers. Mehta et al. have reported that many healthcare workers are concerned about anxiety, depression, burnout, insomnia, and moral distress under unusual circumstances, which force wearing cumbersome and uncomfortable personal protective equipment and keeping up with emerging knowledge and new technologies of COVID-19. [10] Singh et al.'s systematic review meta-analysis has also shown that healthcare workers experienced a crisis of psychological wellbeing. [8] In addition, our

study revealed that healthcare workers bear an additional burden of nursing care for elderly patients in the ageing society.

To avoid excessive load and protect healthcare workers from physical and mental stress, several countermeasures should be taken into account during difficult emerging situations such as this pandemic. First, we should consider the importance of early rehabilitation interventions. According to de Biase et al., delivering rehabilitation in the same way as before the COVID-19 pandemic will neither be practical nor meet patients' needs. [11] As mentioned, rehabilitation should be modified as a needs-based, individual approach in response to the COVID-19 pandemic. Careful training of physical therapy for COVID-19 patients is required in each hospital for COVID-19. Second, early approaches for delirium prevention and management must be adapted. The Hospital Elder Life Program provides creative approaches that comprise several intervention methods, such as providing tablet computers for remote coaching and communication by professionals, volunteers, or family members and providing sleep enhancement methods. [12, 13] Early interventions for adequate programmes for COVID-19 patients, especially elderly patients, are necessary. Third, both healthcare organizations and healthcare workers should acquire knowledge or skills in stress reduction techniques. Callus et al. have summarized the key interventions for healthcare workers to enhance awareness, self-care interventions, mental health services, digital technologies, and organization approaches. [14] It is important to prepare these key interventions in ordinary times because the rapid implementation of these interventions during the pandemic suggests that safety may not have received sufficient attention. [15] Although the abovementioned methods will require additional work for the initial period of time, they will be of great help to maintain good conditions for both healthcare workers and hospital infrastructure in the long term. There are several limitations in this study. This study had retrospective nature and small sample size. In addition, this study was conducted in a single medical center. These conditions can cause outcome reporting bias and patient selection bias. Because we did not evaluate the burden of nursing care quantitatively, it was difficult to explain the burden in a quantitative manner. Nonetheless, we believe that our study had a significant impact to reveal a burden of nursing care for elderly COVID-19 patients during COVID-19 pandemic.

Conclusion

In conclusion, we found that the proportion of elderly patients aged 80 years or older was relatively high during the hospitalization for COVID-19. We should keep in mind that healthcare workers are forced to have an additional burden of nursing care in the ageing society during the emerging COVID-19 pandemic. Interventions to reduce the burden for both patients and healthcare workers are urgently needed.

Declarations

Ethical approval and consent to participate

This study was approved by the National Hospital Organization Kyoto Medical Center institutional review board (approval number: 20-092). All methods were carried out in accordance with relevant guidelines and regulations. Informed consent was obtained from all patients.

Consent for publication

Not applicable.

Availability of data and materials

Data are available from COVIREGI-JP bureau with permission. Only participating institutions can apply for data use.

Competing interests

The authors declare that they have no competing interests.

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We received no funds for conducting this study.

Authors' contributions

KF and EK drafted and revised the manuscript. KF, EK, OK, and HH collected the data for this study. HH, AY, TO, and TM supervised the study and revised the manuscript. All the authors have approved the manuscript for submission.

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Figures

Age-specific COVID-19 disease severity

Figure 1

Age-specific coronavirus disease 2019 disease severity. Blue, red, and grey bars show mild, moderate, and severe disease status, respectively.

Figure 2

Outcome at discharge. The circle graph shows the percentages of alive and death cases. The bar graph shows the age-specific breakdown of the death cases.

Figure 3

Duration of the hospitalization. Orange and grey box plots show the mean duration of hospitalization in patients aged < 80 years and those aged ≥ 80 years, respectively.