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The COVID-19 pandemic and organizational resilience as unanticipated outcome of introducing socially assistive robots in nursing homes

Dear Editor,

Previously we reported on the positive impact of socially assistive robots on older people's activity and social participation in residential care facilities in Japan.[1,2] The robots were introduced alongside a bedside infrared camera, which, in case of emergencies such as falls, sends alerts to the central nursing station, then to the person affected, to inform them that the nursing station is aware (Fig. 1). The 24-week-long, pre-post, quasi-experimental multicenter study in six nursing homes indicated improvements in residents' targeted activities and participation. The stress level and work burden for care professionals during the nightshifts also decreased.[3]

COVID-19 has changed the lives of older people and their carers, and nursing homes have been particularly hard hit. The reported death rates in residential care facilities in proportion to the total number of deaths are extremely high in many countries.[4,5] Although the death rates in nursing homes have been relatively low in Japan, as of May 2020, approximately 20% of the total COVID-19 fatalities were associated with care facilities for older persons.[6]

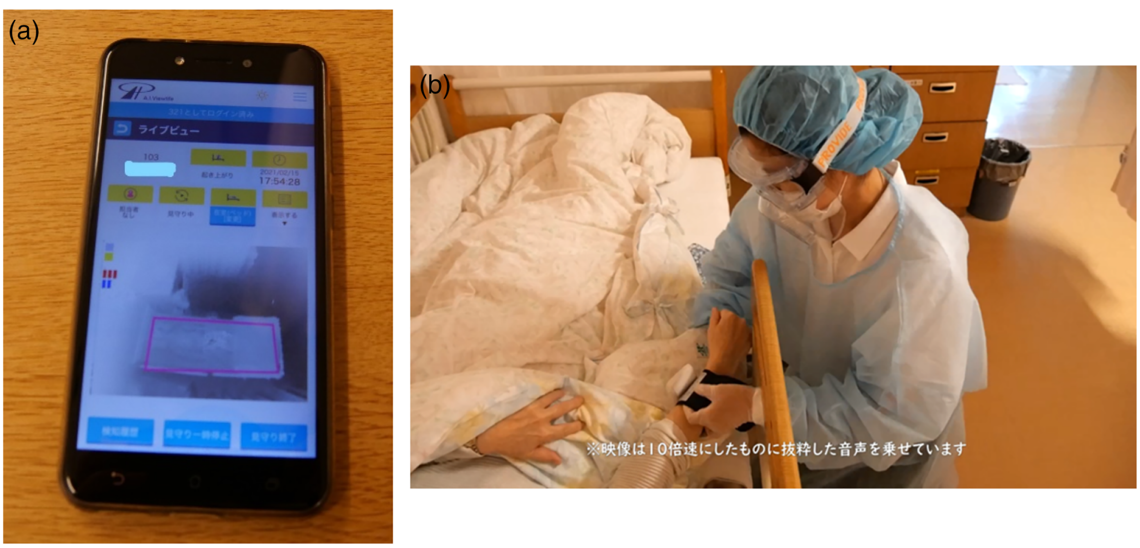

Figure 1 Monitoring system in practice. (a) Staff receiving an alert and a silhouette image, and (b) staff nurse visiting a resident's room and checking vital signs. Consent was given by care recipient and care professional.

Consequently, access to nursing homes and the lives of older people were severely restricted. Nursing homes have been tasked with the great challenge of continuing to provide services to avoid social isolation and loneliness,[7] while ensuring safe care and a high level of vigilance and preparedness for community infections. To meet these two conflicting goals, special measures were adopted in two of the six nursing homes that took part in the previous study.

At the time when the COVID-19 pandemic was announced, the research team had just finished testing a more user-friendly communication robot that monitors the safety of residents and initiates conversations. Owing to the rapidly changing situation, some care facilities had to stop offering services. However, in our nursing homes (comprised of special nursing homes for older people [38 beds, *Tokuyō*] and geriatric health services facilities [40 beds, *Rōken*]), we were able to provide the service seamlessly by adapting the robotics-aided ICT system.

After the introduction of a monitoring system, the care professional in charge had learned to prioritize visits according to urgency and the attentiveness required by the older person. As a result, use of the technologies decreased the frequency of unexpected incontinence as well as the number of visits by staff during night-time. By way of visualizing the positive impact of technology use, staff had developed a new method of communication in the team, acquired heightened awareness of care processes and a clearer sense of what adjustments may be necessary to improve care quality and safety for both care recipients and caregivers.

Although the pandemic was totally unanticipated, when the nursing homes were faced with the challenge of balancing risk and duty of care for the community, this strong sense of ownership of care processes became the source of organizational resilience.[8] The managers and frontline staff introduced the idea of keeping the number of contacts to a minimum, adapting this remote-controlled technology in response to the emergency.

This robotics-aided ICT system allowed us to maintain our services. During the period between February 2020 and January 2021 (333 days), there were only three cases where admissions had to be declined due to the risk of infection. In the meantime, COVID-19-positive cases were found in six hospitals and eight long-term care facilities in the local area. While responding to the increasing demand, two requests for transfer from other care facilities had to be declined. Furthermore, there were 10 cases where older people were admitted to our facilities even when they had fever, as they were widowed or cared for by another older adult who was not able to provide care at that time. As of January 31, 2021, there are no reports of individuals affected by COVID-19. Given that the major routes of infection are believed to be older adults' use of long-term care services, the counter-measures in our facilities have been highly effective.[9] The facilities also installed a negative pressure clean booth, and we regularly carry out polymerase chain reaction (PCR) tests.

While it is highly difficult to quantify these process measures (e.g., improved skills and organizational resilience), it is noteworthy that this robotics-based care system infused agility into the organization. The unanticipated positive effects were enabled by upskilled care staff holding knowledge of and the ability to adjustcare processes and systems. The introduction of assistive technologies can open the black box of care systems,[10] providing great opportunities to learn, reflect on and redesign them collectively.

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Does the COVID-19 pandemic robustly influence the incidence of frailty?

Dear Editor,

The coronavirus disease (COVID-19) pandemic may lead not only to a higher risk of mortality, but also to a higher frailty incidence among older adults. During this time, the amount of physical activity (PA) for older adults has significantly decreased as compared with before the pandemic.[1–5] Our latest study found that physical inactivity influenced by avoidance of COVID-19 infection was particularly high in older adults who lived alone and were socially inactive, making them more likely to become frail than older adults who were not living alone or were socially active.[6] However, this finding was based on an online survey, and it is thus difficult to use an idealized sampling method to investigate the frailty incidence rate. It is therefore not well known whether the incident frailty ratio during the COVID-19 pandemic is higher or lower than that before the pandemic. Given this, the objective of this study was to investigate the new incidence of frailty using the aforementioned data during the pandemic and to compare this with other mail-based survey data collected before the pandemic.

We analysed two types of 1-year follow-up panel surveillance data: an online survey during the COVID-19 pandemic (2020–2021)[6] and a mail survey before the pandemic (2015–2016). Both surveys included older adults aged ≥65 years, and both excluded adults who were frail as defined by the Kihon Checklist (KCL) at the baseline survey or who did not respond to the follow-up survey. The number of participants in the online survey and mail survey was 937 and 12 442, respectively. We used the propensity score matching method to create a matched comparison group (non-pandemic group) from the pre-pandemic mail survey with participants for an online survey during the pandemic (pandemic group). We estimated the scores of the pandemic group for each subject using a multivariable logistic regression model and were able to match 937 pairs from the two groups, wherein the subjects had similar demographic characteristics such as age, sex, body mass index, and KCL score. In a 1-year follow-up survey, we measured the new frailty incidence assessed by the KCL as an outcome.[7]

The demographic characteristics were comparable among the two groups, in terms of the mean age (pandemic group: 73.5 ± 5.5 years, non-pandemic group: 73.5 ± 5.4 years), proportion of women (pandemic group: 48.9%, non-pandemic group: 49.5%), and mean BMI (pandemic group: 22.4 ± 2.8, non-pandemic group: 22.5 ± 2.9). Meanwhile, significant differences were observed between the two groups for the total KCL points with group-by-time interaction using two-way analysis of variance (pandemic group: baseline 3.60 ± 1.98, 1-year follow-up: 4.84 ± 2.87; non-pandemic group: baseline 3.60 ± 2.21, 1-year follow-up 4.03 ± 3.30, $F = 40.87$; $P < 0.001$). After the

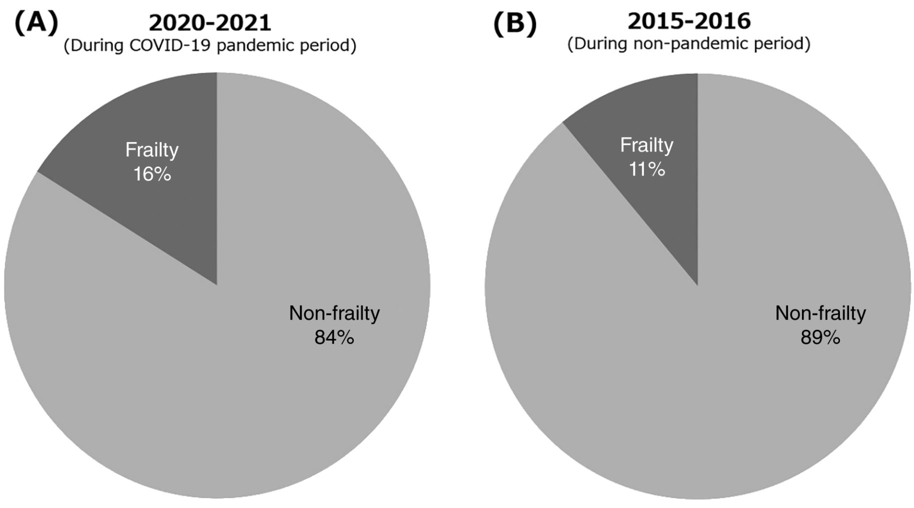

Figure 1 After 1-year follow-up, 16.0% in the pandemic group (a) and 11.0% in the non-pandemic group (b) had new incident frailty. The pandemic group had a significantly higher risk of incident frailty than the non-pandemic group (odds ratio: 1.54, 95% confidence interval: 1.18–2.02).

