



TITLE:

# Changes in Older People's Activities During the Coronavirus Disease 2019 Pandemic in Japan

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# Journal Pre-proof

Changes in older people's activities during the Covid-19 pandemic in Japan

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## LETTER TO THE EDITOR

TITLE: Changes in older people's activities during the Covid-19 pandemic in Japan

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RUNNING TITLE: Mobility during Covid19

KEY WORDS: COVID-19, mobility, older people, social distance message

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SUMMARY: Behaviors of older adults, the population most vulnerable to Covid-19, may be one of keys in tacking the virus as a country, though it is not usually covered in a mobility big data. Our unique IoT data shows older adults have considerably decreased their social and physical activities in response to social distancing messages from community.

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## Journal Pre-proof

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## DECLARATION OF COMPETING INTERESTS

None declared.

## INSTITUTIONAL REVIEW BOARD APPROVAL

The Institutional Review Board (IRB) of Kyoto University approved the study (R1669). We obtained written IC from all participants. We analyzed data anonymously using research ID while we securely use a resident name table linking to the research ID for making individual feedback sheets. This research was conducted in accordance with the principles embodied in the Declaration of Helsinki

## 1 **Changes in older people's activities during the Covid-19 pandemic in Japan**

2

3 The rapid spread of the coronavirus disease 2019 (Covid-19) pandemic has led state and local  
4 leaders to introduce social/physical distancing and self-isolation. Aggregated mobility data  
5 collected by private companies has been available to help understand the impact of such  
6 measures on population mobility patterns.<sup>1</sup> However, because the older population is not  
7 likely to be represented in such data, partly due to their technology adaptation issues,<sup>2,3</sup> we  
8 may not know how older adults have reacted to these community/policy messages.

9

10 We had access to a unique dataset comprising behavior logs of older adults living in a  
11 continuing care retirement community (CCRC), which enabled us to estimate the time spent  
12 in common areas and walking distance within the CCRC. We analyzed data from 114  
13 residents aged 67 to 92, 70.4 % female. All of them were residents in independent apartment  
14 units and carried a beacon transmitter daily as part of a research project since September  
15 2018.<sup>4</sup>

16

17 During the follow-up period from January 1, 2020 until May 25, 2020, there were two major  
18 messages related to Covid-19 to senior residents: first, the CCRC announced the cancellation  
19 of all upcoming in-facility events/exhibitions and the closure of some common facilities as a

20 precaution measure (24 February); subsequently, the state of emergency was declared by the  
21 prime minister, asking people to stay at home (7 April), and this was eventually lifted by the  
22 end of the follow-up period. Figure 1 shows (a) daily time spent in common areas and (b)  
23 daily walking distance over the follow-up period. According to our interrupted time series  
24 analysis,<sup>5</sup> the time spent in common areas decreased immediately following the CCRC  
25 announcement by 12.7% (10.9 min [95% confidence interval (CI) = -17.2, -4.5]). After the  
26 CCRC announcement until the state of emergency declaration, the time spent in common  
27 areas remained at a low level, while the walking distance gradually decreased at a rate of  
28 0.5% (5.4 m/day [95% CI= -10.4, -0.4]). The state of emergency declaration had a further  
29 significant acute impact on the time spent in common areas by 7.8% decrease (6.5 min/day  
30 [95% CI = -11.1, -1.8]) and the daily walking distance by 20.3% decrease (-186.8 m [95% CI  
31 = -333.0, -40.6]) (Table S1).

32

33 The time spent in common areas is likely to be related to face-to-face social interaction,  
34 which is usually an important aspect of healthy ageing; however, such interaction is to be  
35 avoided during the Covid-19 pandemic. The data showed that older adults reduced their  
36 social time largely in response to the message from their immediate community, although  
37 there was no explicit request to avoid social contact. The state of emergency, which was not  
38 enforceable, had a further reducing effect on social time. A known characteristic of Japanese

39 individuals quoted as “the government asked, people listened” has been suggested as one of  
40 the possible reasons for the relatively low mortality rate of Covid-19 as of 15 July 2020 in  
41 Japan without adopting draconian measures for tackling the virus.<sup>6</sup> Our study seems to  
42 support this hypothesis, applicable at least to the population most vulnerable to Covid-19. On  
43 the other hand, the reduction of walking distance over the period needs a different implication.  
44 It is a physical activity conducted individually or as a pair and residents were under no  
45 restrictions in moving in and around the various buildings in the CCRC during the period.  
46 Psychological impact from Covid-19-related messages on people’s behaviors should be  
47 concerned here and the possible health impact of these suppressing social and physical  
48 activities during the pandemic could be an important research issue in gerontology in the  
49 future.

50

51 **FIGURE CAPTIONS**

52

53 Figure 1

54 Title: Changes in levels and trends of older adults' activities during the Covid-19 pandemic

55

56 Description: Means of daily time spent in common area (a) and walking distance (b) between January 1

57 and May 24, 2020. The left dotted line indicates the day when the continuing care retirement community

58 (CCRC) announced the cancellation of all in-facility events and closure of some facilities (Feb 24, 2020),

59 and the right dotted line represents the day when the state of emergency was declared (April 7, 2020).

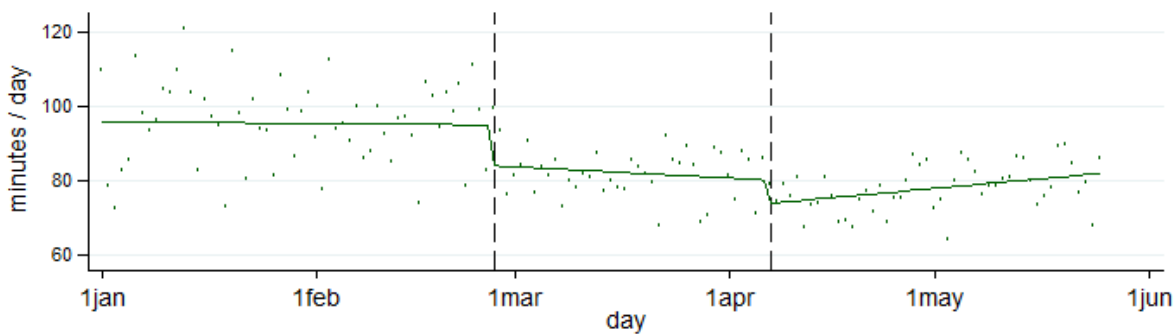
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a) Daily time spent in common area



b) Daily walking distance

