



Older Adults' Resilience Against Impact of Lifestyle Changes During the COVID-19 Pandemic

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Ayaka Kasuga¹ , Saori Yasumoto¹, Takeshi Nakagawa²,
Yoshiko Ishioka³, Akari Kikuchi¹, Hiroki Inagaki⁴,
Madoka Ogawa¹, Noriko Hori⁴, Yukie Masui⁴,
Hwang Choe¹, Hiroyuki Muto⁵, Mai Kabayama¹,
Kayo Godai¹, Kazunori Ikebe¹, Kei Kamide¹,
Tatsuro Ishizaki⁴, and Yasuyuki Gondo¹

Abstract

Background: Older adults were expected to experience a decline in physical activities and an increase in social isolation during the COVID-19 pandemic. **Methods:** We investigated the changes in living conditions of 508 older adults (79.70 years \pm 0.88) before (from July to December 2019) and during (in August 2020) the pandemic. We compared the mean score for the same individual instrumental activities of daily living (IADL), frequency of going out, exercise, and social interaction at two-time points. We also examined the influence of living arrangement (living alone or not) on the frequency of exercise and social interaction. **Results:** The frequency of going out decreased during the pandemic (in 2020); however, there was no significant change in IADL. The frequency of exercise and social interaction increased irrespective of the living arrangement. The frequency of exercise increased more in those living alone. **Conclusions:** Although older adults refrained from going out, they compensated for the risks of inactivity in daily life by increasing or maintaining their frequency of exercise and social interactions. The view that “older adults have a poor ability to accommodate the lifestyle changes during the COVID-19 pandemic” may be a stereotypical assumption.

Keywords

compensation, COVID-19 pandemic, resilience, exercise, social interaction

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Introduction

Since the earliest phase of COVID-19 pandemic, the life-threatening risks of infection have been the focus of attention. At the same time, researchers have been warning citizens the secondary risk of the social restrictions because it may cause the decline in physical activities (Chen, 2020) and social isolation (Armitage & Nellums, 2020; Chen, 2020) among older adults. Indeed, researchers reported that the level of physical activities among older adults declined once the pandemic started (Okely et al., 2021; Wang et al., 2020; Yamada et al., 2021). Previous studies also reported that social isolation result from the pandemic negatively affected older adults' mental health (Krendl & Perry, 2021; Robb et al., 2020).

Older adults who live alone were particularly concerned that they may receive the great impact of the secondary effects (Armitage & Nellums, 2020). Additionally,

the lockdown, social distancing, and cessation of community activities may enhance older people the risk of frailty, sarcopenia, anxiety, depression, and cognitive decline; consequently, they would face a difficult time to re-adjust their daily living once the pandemic clears out (Chen, 2020). We aimed to understand the changes in living conditions of older adults before (in 2019) and during

¹Osaka University, Suita, Japan

²National Center for Geriatrics and Gerontology, Obu, Japan

³O.P. Jindal Global University, Sonapat, India

⁴Tokyo Metropolitan Institute of Gerontology, Itabashi, Japan

⁵Kyoto University, Kyoto, Japan

Corresponding Author:

Ayaka Kasuga, Graduate School of Human Sciences, Osaka University, 1-2, Yamada-oka, Suita-City, Osaka 565-0871, Japan.
Email: ayaka826spring.sun@gmail.com



(in August 2020) the pandemic by focusing on behaviors of exercise and social interaction.

Methods

Participants and Procedure

The SONIC study (Septuagenarians, Octogenarians, Nonagenarians Investigation with Centenarians) is the longitudinal cohort study started in 2010 (Gondo et al., 2017; Tokyo Metropolitan Institute of Gerontology, n.d.). Participants consist of three age cohorts in their 70s, 80s, and 90s. In this study, we focused on the 70s cohort. They were first recruited in 2010 and then participated in the follow-up assessments in every 3 years until 2019. We mailed survey in August 2020 to examine their living conditions under the COVID-19. We received 812 replies out of 1,051 (77% response rate). We analyzed the data of 508 participants (261 women) who participated in both the 2019 and 2020 surveys (see Supplemental Figure 1). A mean age of participants was $79.70 \text{ years} \pm 0.88$ in 2020.

Measures

We used five items of the Instrumental Abilities of Daily Living (IADL), which is a subscale of the Tokyo Metropolitan Institute of Gerontology Index of Competence (Koyano et al., 1991). The participants were asked to rate each item whether they are able (“yes”) or unable to do so (“no”) and scored 1 for “yes” and 0 for “no.” To assess the decline in physical strength and the increased frequency of stumbling or falling, we used the following questions in the survey of August 2020: “Have you experienced a decline in your physical strength during the lockdown?” and “Have you experienced an increase in the frequency of stumbling or falling during the lockdown?” (from 1 = strongly disagree to 4 = strongly agree).

The frequency of going out was measured using the item “How often do you go out for reasons such as shopping, walking, and going to the hospital?” (from 1 = less than once a week to 5 = every day). In the survey of August 2020, we added the question “How often did you go out for reasons such as shopping, walking, and going to hospital during lockdown (between April and May in 2020).” Exercise habits were assessed using the item “How often do you do light exercise per week?” (from 1 = never to 6 = every day). Social interaction was assessed by the frequency of meeting with neighbors, friends, and relatives (from 1 = never to 6 = twice or more per week) and frequency of contact over phone or mail with neighbors, friends, and relatives (from 1 = never to 6 = twice or more per week).

As for demographic information, we included age, sex (0 = men, 1 = women), and living arrangement (0 = living with other people and 1 = living alone) at the time of the survey in August 2020.

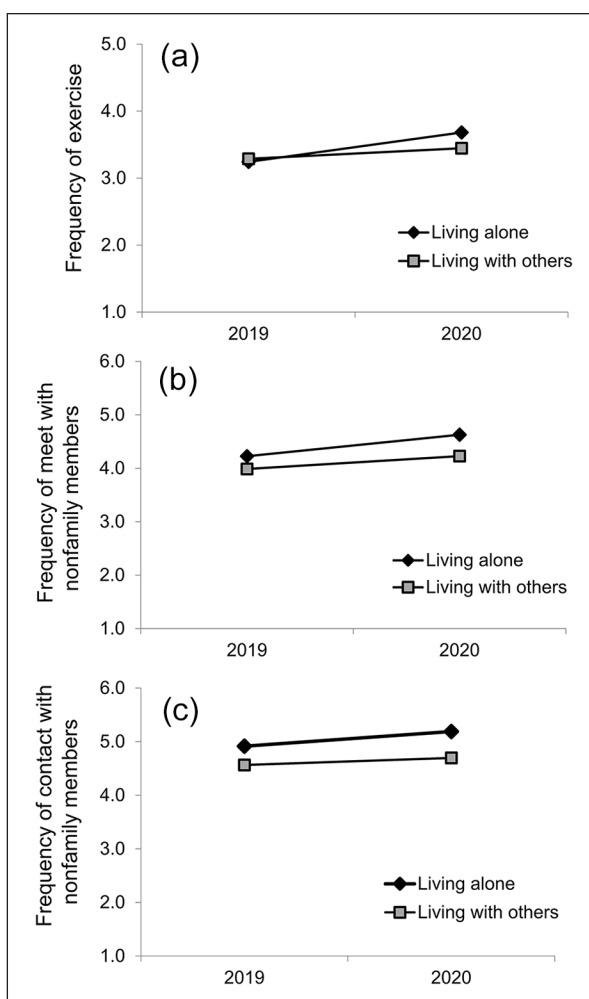


Figure 1. Change in frequency of exercise and social interaction for each living arrangement (living alone or not). (a) showed change in frequency of exercise, (b) showed change in frequency of meet with nonfamily members, and (c) showed change in frequency of contact with nonfamily members.

Analysis

To compare the mean score of each variable (IADL, frequency of going out, frequency of exercise, and frequency of social interaction) between 2019 and 2020, paired sample *t*-tests were conducted. A one-way within-subject ANOVA was conducted to compare the frequency of going out between the following three points: before the pandemic (in 2019), during the lockdown (between April and May 2020), and after the lockdown (in August 2020). The degrees of freedom were adjusted using the Greenhouse-Geisser’s epsilon for violation in the sphericity test. A two-way mixed ANOVA was conducted to determine the extent to which the pandemic and living arrangement affected the frequency of exercise and social interaction.

Ethical Approval

This study protocol was reviewed and approved by the ethics board of the School of Human Sciences of Osaka

University [Jin-kou 30-121, HB020-020] and the Institutional Review Board of the Tokyo Metropolitan Institute of Gerontology [Issue#2 in 2019, Issue#Jin11 in 2020].

Results

Table 1 presents descriptive characteristics and the results of within-subject tests. A paired sample *t*-test revealed that the frequency of going out in August 2020 was less than that in 2019 ($t(504)=4.42, p<.001, d=0.197$). The result of one-way within-subjects ANOVA comparing the frequency of going out between 2019, the lockdown period (April and May in 2020), and August 2020 was significant ($F(1.9, 955.7)=79.19, p<.001, \eta_G^2=.051$). Shaffer's multiple comparison tests revealed that in 2019 there was a higher frequency of going out than in the lockdown period ($p<.001$) and in August 2020 ($p<.001$). Frequency of going out was higher in August 2020 than in the lockdown period ($p<.001$).

Table 1 shows that participants who answered the decline in their physical strength during the lockdown were limited ($M=2.09, SD=0.96$). The participants who replied increase in the frequency of stumbling or falling during the lockdown were few ($M=1.57, SD=0.70$). A paired sample *t*-test revealed that the difference in total score of IADL between 2019 and August 2020 was not significant ($t(502)=0.72, p=.473, d=0.032$).

Frequency of exercise has increased significantly between 2019 and August 2020 ($t(502)=3.94, p<.001, d=0.176$). Frequency of meeting ($t(486)=3.43, p=.001, d=0.156$) and contact ($t(492)=2.51, p=.013, d=0.113$) with nonfamily members increased significantly from 2019 to August 2020.

A two-way mixed ANOVA was conducted to determine whether the state of the pandemic and living arrangement had any effect on the frequency of exercise and social interaction (Table 2). For frequency of exercise, there was a significant interaction between the effects of the pandemic and living arrangement ($F(1, 500)=4.43, p=.036, \eta_G^2=.002$). Simple main effect analysis showed that frequency of exercise in August 2020 was significantly higher than that in 2019 among both those participants living alone ($F(1, 106)=9.75, p=.002, \eta_G^2=.028$) and those participants living with other people ($F(1, 394)=7.20, p=.008, \eta_G^2=.003$) (Figure 1). For frequency of meetings with nonfamily members, there was no significant interaction between the effects of the pandemic and living arrangement ($F(1, 484)=0.69, p=.407, \eta_G^2=.000$), and the main effects of the pandemic ($F(1, 484)=10.74, p=.001, \eta_G^2=.006$) and living arrangement ($F(1, 484)=4.20, p=.041, \eta_G^2=.006$) were significant. For frequency of contact over phone or mail with nonfamily members, there was no significant interaction between the effects of the pandemic and living arrangement ($F(1, 490)=0.85, p=.358,$

$\eta_G^2=.000$), and the main effects of the pandemic ($F(1, 490)=6.98, p=.009, \eta_G^2=.004$) and living arrangement ($F(1, 490)=9.67, p=.002, \eta_G^2=.015$) were significant.

Discussion and Conclusion

We aimed to understand the living conditions of older adults before and during the pandemic, focusing on their exercise and social interaction. During the pandemic, people were restricted to go out and engage in social activities; however, we found that older adults who live independently have high resilience against such a situation. For example, the frequency of going out decreased at the time of lockdown, but it recovered after that. Also, the participants increased the amount of exercise and chances of social interaction during the pandemic. We assume that participants placed an effort to exercise at home to compensate the risk of inactivity. Although they avoided participating in events where many people are gathering, they seemed to have contact with their close friends and family members.

Researchers are concerned that older adults will not be able to return to their everyday daily living when the pandemic is over because they will lose physical strength (Chen, 2020). Yamada et al. (2021) investigated the impact of the COVID-19 pandemic on physical activity and the incidence of frailty by targeting older adults who were 65 to 84 years old without frail condition at the baseline on January 2020 (51.7% were pre-frail condition). They reported that older adults' physical activity decreased during the pandemic and 16% of participants developed a frail condition. In contrast, about 65% of our participants were pre-frail or frail condition at the baseline in 2019 (54.8% of participants were in pre-frail condition and 10.8% were in frail condition) according to the Japanese version of the Cardiovascular Health Study criteria. Our participants had a higher prevalence of pre-frailty and frailty at the baseline than participants of the previous study (Yamada et al., 2021). Therefore, we could predict that participants of our study might exacerbate the frailty condition and become unable to live independently due to the pandemic. Even though our participants have high pre-frailty and frailty prevalence, they rated their levels of IADL as high as in 2019, which were maintained in August 2020. They maintained their levels of IADL and increased the amount of exercise and chances of social interaction regardless of their frailty conditions. Thus, we assumed that maintaining the high levels of IADL is more important than avoiding becoming a frail condition. Additionally, a different study conducted in the early period of the pandemic reported that older adults rated their well-being as high as, or even higher than, the pre-pandemic years (Kivi et al., 2021). Considering the results of this study and the previous reports, older adults can compensate for the risks of inactivity in daily life to maintain their physical strength and psychological health even under

Table 1. Descriptive Characteristics and Within-Subject Tests.

Variables	N	2019		April and May 2020		August 2020		Within-subject tests
		M/%	SD	M/%	SD	M/%	SD	
Age	508	78.87	0.82			79.70	0.88	
Sex (% women)	508	51.38				51.38		
Living arrangements (% living alone)	507					21.10		
IADL (1–5)	503	4.84	0.53			4.83	0.53	$t(502) = 0.72, p = .473, d = 0.032$
Subjective declining in physical strength during lockdown (1–4)	492					2.09	0.96	
Increase in frequency of stumbling or falling down during lockdown (1–4)	492					1.57	0.70	
Frequency of going out (1–5)	505	3.64	1.29			3.38	1.27	$t(504) = 4.42, p < .001, d = 0.197$ $F(1.9, 955.7) = 79.19, p < .001, \eta_G^2 = .051$ (2019 > August 2020 > April and May 2020) ^b
Frequency of exercise (1–5)	503	3.28	1.37	2.92 ^a	1.28 ^a	3.50	1.34	$t(502) = 3.94, p < .001, d = 0.176$
Frequency of meet with nonfamily members (1–6)	487	4.04	1.66			4.31	1.65	$t(486) = 3.43, p = .001, d = 0.156$
Frequency of contact with nonfamily members (1–6)	493	4.64	1.47			4.80	1.38	$t(492) = 2.51, p = .013, d = 0.113$

^aRetrospective report at time of survey in August 2020.^bShaffer's multiple comparison test was performed.

Table 2. Means, Standard Deviations, and Two-Way mixed ANOVA Statistics.

Variables	Living arrangement				ANOVA				
	Living alone		Living with others		Effect	F ratio	df	p	η^2
	M	SD	M	SD					
Frequency of exercise (N=502)									
2019	3.24	1.37	3.29	1.38	L	0.52	1, 500	.470	.001
August 2020	3.68	1.20	3.45	1.38	T	19.78	1, 500	.000	.008
					L × T	4.43	1, 500	.036	.002
Frequency of meet with nonfamily members (N=486)									
2019	4.23	1.60	3.99	1.68	L	4.20	1, 484	.041	.006
August 2020	4.63	1.60	4.23	1.66	T	10.74	1, 484	.001	.006
					L × T	0.69	1, 484	.407	.000
Frequency of contact with nonfamily members (N=492)									
2019	4.92	1.38	4.56	1.49	L	9.67	1, 490	.002	.015
August 2020	5.19	1.19	4.70	1.42	T	6.98	1, 490	.009	.004
					L × T	0.85	1, 490	.358	.000

Note. ANOVA=Analysis of variance; L=Living arrangement; T=Time of survey.

the activity restriction due to the pandemic. Therefore, we consider that older adults can return to normal daily activities when restrictions are lifted.

Older adults living alone were of special concern and were expected to experience negative impact due to the pandemic compared to older adults who live with other people (Armitage & Nellums, 2020). One previous study reported that older adults who live alone and are socially inactive are more likely to decrease physical activity during the pandemic and to develop a frail condition (Yamada et al., 2021). However, the participants in our study showed no behavioral differences regardless of their living arrangement. Possibly the participants are socially active group to some extent for the fact that they continued participating in the SONIC study over the years. Additionally, this study showed that the frequency of exercise between 2019 and August 2020 increased more on a group of participants who live alone than those who live with other people. We assumed that such a pattern emerged because people who live alone are more concerned about keeping their functional abilities to care for themselves.

Our study suggests that “older adults have a poor ability to accommodate the lifestyle changes during the COVID-19 pandemic” is a stereotypical assumption. Today where the average life expectancy is expanding, older adults are diverse in their health status and levels of activities. Although the diversity of older adults has become widely accepted by researchers, we tend to talk about older adults by lumping 65+ people together when an unprecedented situation such as a pandemic has happened (Chen, 2020). From the study, we found the importance of paying attention to the levels of activities and IADL rather than age to determine who needs support.

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Data Availability Statement

The data of SONIC study are not publicly available. You need to contact the author if you want to access the data.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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ORCID iD

Ayaka Kasuga  <https://orcid.org/0000-0002-6184-996X>

Supplemental Material

Supplemental material for this article is available online.

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