



## Older Adults Used Fewer Home Care Services during the COVID-19 Pandemic: Findings from a Secondary Analysis of an Urgent Survey in Japan

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**Background:** This study aimed to identify reduced home care use among older people and its impact on user numbers and service provider revenues during the coronavirus disease 2019 (COVID-19) pandemic. **Methods:** We conducted this secondary analysis of cross-sectional data from long-term care providers in Japan and estimated the probability of client cancellations and service contraction for institutional and home care services adjusted for the service type, area, size, infection occurrence, and staff employment impacts. We then estimated the rate of change in user numbers and revenue related to reduced usage. **Results:** Seventy-two percent of home care providers experienced client cancellations and 42.1% experienced service contraction, both of which were more prevalent in home care than in institutional care (adjusted odds ratio [AOR]=11.09 and 1.60). Home-visit (AOR=0.70) and short-term stay (AOR=0.38) services were less likely to experience client cancellations compared with adult day services. Service contraction was less likely in home-visit services (AOR=0.60) but were more likely in short-stay services (AOR=1.49) compared to adult day services. The estimated reductions in user numbers and revenue related to service contraction for adult day services were 9.1% and 7.1%, respectively. Home-visiting services decreased by an estimated 3.4% owing to service contraction. **Conclusion:** The secondary effects of the COVID-19 pandemic include reduced use of home care services, especially adult day services that include social contact. These secondary effects of the COVID-19 pandemic may cause functional deterioration in non-infected clients and financially impact service providers.

**Key Words:** Adult day care centers, COVID-19, Home care services, Long-term care, Respite care

### INTRODUCTION

Older adults are vulnerable to both coronavirus disease 2019 (COVID-19) and the secondary effects of the pandemic.<sup>1)</sup> Given the lack of effective pharmacological treatment, home isolation has been recommended to prevent infection,<sup>2)</sup> which raises concerns regarding the secondary effects on older people living in the community, including reduced physical activity, social isolation, and reduced access to home care services.<sup>3-5)</sup>

Older people living in the community face additional challenges

related to reduced home care.<sup>6,7)</sup> Even in facilities in which no outbreaks have occurred, home care has been reduced or suspended because employees are required to stay home to prevent the spread of infection and thus are unable to provide care.<sup>8,9)</sup> Families are reluctant to send older people to long-term care (LTC) facilities,<sup>8)</sup> which causes confusion and stress not only to clients but also to family caregivers. The symptoms of people with dementia may also be aggravated by disruptions in their usual lifestyle and prolonged indoor living.<sup>1,10)</sup> Furthermore, a significant decrease in user numbers negatively affects home LTC provider businesses.<sup>11)</sup>

However, little is known about how reduced use affects home care.<sup>7)</sup>

In Japan, the Ministry of Health, Labour and Welfare restricted visits to clients in LTC facilities from February 24, 2020, before a steep increase in the number of cases.<sup>12)</sup> In early March, the first outbreak at an adult day service was identified, following which other LTC providers in the area were required to close.<sup>9)</sup> In late March, the number of infections increased, and on April 1, the government's expert panel recommended suspending or restricting day care services for persons with disability.<sup>13)</sup> A survey of home LTC providers conducted in April showed that 25.6% of respondents had experienced decreases of income of 20% or more in March compared to those in February.<sup>11)</sup> On April 7, a state of emergency was declared for seven prefectures, which was gradually expanded. One percent or more of the adult day services for people with disabilities were closed during this period.<sup>14)</sup> A total of 39 LTC facilities had experienced outbreaks by May 9.<sup>15)</sup>

This study investigated the reduced use of home LTC services using data from an urgent survey of LTC providers in Japan. Reduced usage in this study included both client cancellations (i.e., users voluntarily refraining from using the service) and service contraction (i.e., service providers reducing service availability). To evaluate the magnitude of the effects on home care, we compared the impact of home care services to that of institutional services and assessed which of these home care services were more likely to be affected. The research questions were as follows. (1) Were home LTC services more likely to experience reduced usage than institutional LTC services during the COVID-19 pandemic? Which home LTC services were the most affected? (2) To what extent did reduced usage affect user numbers and provider revenues for each service?

## MATERIALS AND METHODS

### Data

We conducted this secondary analysis of survey data from the Urgent Survey on the Impact of COVID-19 on Long-term Care and Support for Older Adults and Practices and Innovations in the Field. This web-based survey was conducted by members of the Long-Term Care Benefit Expense Subcommittee of the Social Security Council through 15 national associations of LTC providers in Japan. From May 12 to 22, 2020, a total of 6,130 providers responded to the survey. The survey was anonymously conducted, with participant contact information collected voluntarily only when the participants agreed to follow-up surveys. A report of the main survey has already been published.<sup>16)</sup> We obtained the anonymized data, and ethical approval was not required to obtain

these data because they are not participant-identifiable.

### Subjects

The analysis included institutional and home care services covered by public LTC insurance. The institutional care services included nursing homes, geriatric health service facilities, and group homes. The home care services included adult day, home visit, and short stay services.

### Research Question 1

Multivariate logistic regression analysis was conducted with usage reduction as the dependent variable and each service category (i.e., institutional or home care, adult day service, home visit service, or short stay service) as an independent variable. Usage reduction included two categories: client cancellations initiated by clients or their families and service contraction in which service providers reduced or stopped service availability. Client cancellations were measured by a single item asking providers whether they had experienced any cancellation by clients or families. Service contracts were measured using items such as facility closure owing to local governmental request or facility decision, provider requests that users refrain from using the facility, restriction or suspension of new users, and reduced daily service hours. Providers who experienced one or more of these situations were categorized as having experienced service contraction.

We adjusted for three types of variables: (1) service size (because a larger provider is more likely to experience reduced service); (2) service area (because organizations participating in the survey differed in the types of service offered and regional response rates); and (3) occurrence or suspicion of COVID-19 infection among clients, family members, or staff and the impact of COVID-19 on staff employment as they were strong predictors of service reduction. The service size was categorized as (1) < 10 full-time equivalent (FTE) employees, (2) 10–30 FTE, and (3) ≥ 30 FTE. Areas were categorized based on prefectural alert levels: (1) seven prefectures, including Tokyo, where a state of emergency was declared on April 7, (2) six prefectures that were added to the list of specified prefectures on April 16, and (3) another 34 prefectures where a state of emergency was declared on April 16 and where earlier categories indicated an earlier infection spread. The occurrence/suspicion of COVID-19 among clients or family was measured based on whether any client or family member had tested positive for or was suspected of having COVID-19 or had close contact with someone with COVID-19. The occurrence/suspicion of COVID-19 among staff was measured based on whether any staff member had tested positive for infection or had close contact with someone with COVID-19. The impact on staff em-

ployment included employment restrictions, absence or retirement related to infection, fear of infection, or increased childcare and housework of employees.

### Research Question 2

A multiple linear regression analysis was conducted for each service, with the change rate in the user numbers and revenue compared to the previous year as dependent variables and client cancellations and service contraction as independent variables adjusted for service size. This approach was adopted because the data did not include the number of clients with reduced usage and because a simple comparison to the previous year could not distinguish between the time trend and the effect of reduced usage. We retrospectively collected data on the numbers of users in April 2019 and April 2020 and calculated the rate of change by dividing the latter by the former. The participants directly provided their revenue rate of change in April 2020 compared to April 2019. We excluded cases with missing values for each analysis.

## RESULTS

### Participant Characteristics

A total of 6,171 responses were obtained. After excluding cases with missing variables, the analyses included 5,089 responses. The numbers of institutional care, adult day service, short stay service, and home visiting service clients were 2,569, 844, 217, and 1,459, respectively.

Table 1 shows the characteristics of the participating providers. More than half of the institutional care (63.3%) and short stay service (61.8%) providers were large scale providers, with smaller proportions of adult day service (5.2%) and home visiting service (1.6%) providers. The number of respondents from high-alert areas was larger for home visit services (46.8%) and smaller for short stay services (23.0%). Infection and suspected cases occurred more frequently in home visit services (29.3%). Less than 2.2% of providers had infection or contact with COVID-19 patients for all services. More than 50% of participants reported impacts on staff employment in all services.

### Client Cancellations and Service Contraction

Thirty-one percent of institutional care providers and 72.0% of home care providers experienced client cancellations. Table 2 shows the prevalence of reduced usage and the results of the logistic regression analysis with client cancellations and service contraction as dependent variables. Service type was significantly associated with client cancellations, with an adjusted odds ratio (AOR) of 11.09.

Service contraction occurred in 38.2% of institutional care and 42.1% of home care providers. While service contraction was significantly more likely to occur in home care, the AOR of 1.60 was lower than that for client cancellations. Among home care services, adult day service had the highest rate of client cancellation (76.7%). Short stay services were less likely to experience client cancellations (AOR = 0.38) than adult day services but were more

**Table 1.** Service provider characteristics

	Institutional (n = 2,569)	Home care (n = 2,520)	Adult day (n = 844)	Short stay (n = 217)	Home visiting (n = 1,459)
Service size					
Small	217 (8.4)	1,600 (63.5)	473 (56.0)	30 (13.8)	1,097 (75.2)
Mid	650 (25.3)	719 (28.5)	327 (38.7)	53 (24.4)	339 (23.2)
Large	1,702 (66.3)	201 (8.0)	44 (5.2)	134 (61.8)	23 (1.6)
Area					
With earlier alert	748 (29.1)	1,000 (39.7)	267 (31.6)	50 (23.0)	683 (46.8)
With mid alert	389 (15.1)	361 (14.3)	130 (15.4)	33 (15.2)	198 (13.6)
With later alert	1,432 (55.7)	1,159 (46.0)	447 (53.0)	134 (61.8)	578 (39.6)
Infection/suspicion among users or family					
No	2,282 (88.8)	1,968 (78.1)	737 (87.3)	200 (92.2)	1,031 (70.7)
Yes	287 (11.2)	552 (21.9)	107 (12.7)	17 (7.8)	428 (29.3)
Infection/suspicion among staff					
No	2,512 (97.8)	2,474 (98.2)	831 (98.5)	214 (98.6)	1,429 (97.9)
Yes	57 (2.2)	46 (1.8)	13 (1.5)	3 (1.4)	30 (2.1)
Impact on staff employment					
No	937 (36.5)	1,208 (47.9)	409 (48.5)	94 (43.3)	705 (48.3)
Yes	1,632 (63.5)	1,312 (52.1)	435 (51.5)	123 (56.7)	754 (51.7)

**Table 2.** Associations between service types and usage restrictions

		Client cancellations					Service contraction					
		n (%)	OR	AOR	LLCI	ULCI	n (%)	OR	AOR	LLCI	ULCI	
All services (n = 5,089)	Service type											
	Institutional	805 (31.3)	Ref	Ref			983 (38.3)	Ref	Ref			
	Home care	1,816 (72.1)	5.65*	11.09*	9.14	13.46	1,062 (42.1)	1.18*	1.60*	1.36	1.89	
	Service size											
	Small	1,151 (63.3)	Ref	Ref			717 (39.5)	Ref	Ref			
	Mid	647 (47.3)	0.52*	1.08	0.91	1.30	465 (34.0)	0.79*	0.90	0.76	1.05	
	Large	823 (43.2)	0.44*	2.58*	2.07	3.23	863 (45.3)	1.27*	1.74*	1.44	2.10	
	Area											
	With earlier alert	1,079 (61.7)	Ref	Ref			881 (50.4)	Ref	Ref			
	With mid alert	390 (52.0)	0.67*	0.80*	0.66	0.98	312 (41.6)	0.70*	0.75*	0.63	0.89	
	With later alert	1,152 (44.5)	0.50*	0.64*	0.56	0.74	852 (32.9)	0.48*	0.55*	0.48	0.63	
	Infection/suspicion among users or family											
	No	2,019 (47.5)	Ref	Ref			1,595 (37.5)	Ref	Ref			
	Yes	602 (71.8)	2.81*	1.84*	1.53	2.21	450 (53.6)	1.93*	1.48*	1.26	1.73	
	Infection/suspicion among staff											
	No	2,550 (51.1)	Ref	Ref			1,980 (39.7)	Ref	Ref			
	Yes	71 (68.9)	2.12*	1.39	0.87	2.21	65 (63.1)	2.60*	1.64*	1.08	2.5	
Impact on staff employment												
No	959 (44.7)	Ref	Ref			656 (30.6)	Ref	Ref				
Yes	1,662 (56.5)	1.60*	1.87*	1.63	2.14	1,389 (47.2)	2.03*	1.75*	1.54	1.98		
Home care services (n = 2,520)	Service type											
	Adult day	646 (76.5)	Ref	Ref			365 (43.2)	Ref	Ref			
	Short stay	111 (51.2)	0.32*	0.38*	0.26	0.57	116 (53.5)	1.51*	1.49*	1.02	2.16	
	Home-visiting (n = 1,549)	1,059 (72.6)	0.81*	0.70*	0.57	0.87	581 (39.8)	0.87	0.72*	0.6	0.87	
	Service size											
	Small	1,133 (70.8)	Ref	Ref			678 (42.4)	Ref	Ref			
	Mid	571 (79.4)	1.59*	1.47*	1.17	1.84	275 (38.2)	0.84	0.70*	0.58	0.85	
	Large	112 (55.7)	0.52*	0.77	0.51	1.16	109 (54.2)	1.61*	1.01	0.69	1.48	
	Area											
	With earlier alert	784 (78.4)	Ref	Ref			479 (47.9)	Ref	Ref			
	With mid alert	259 (71.7)	0.70*	0.77	0.58	1.03	153 (42.4)	0.8	0.81	0.63	1.03	
	With later alert	773 (66.7)	0.55*	0.67*	0.55	0.83	430 (37.1)	0.64*	0.68*	0.57	0.82	
	Infection/suspicion among users or family											
	No	1,343 (68.2)	Ref	Ref			783 (39.8)	Ref	Ref			
	Yes	473 (85.7)	2.79*	2.34*	1.78	3.06	279 (50.5)	1.55*	1.47*	1.19	1.8	
	Infection/suspicion among staff											
	No	1,777 (71.8)	Ref	Ref			1,034 (41.8)	Ref	Ref			
Yes	39 (84.8)	2.19*	1.13	0.48	2.64	28 (60.9)	2.17*	1.68	0.9	3.1		
Impact on staff employment												
No	785 (65.0)	Ref	Ref			421 (34.9)	Ref	Ref				
Yes	1,031 (78.6)	1.98*	1.81*	1.5	2.18	641 (48.9)	1.79*	1.67*	1.42	1.98		

Multivariate logistic regression analysis (adjusted for the service size, area, infections/suspicion among users and family, infections/suspicion among staff, and impact on staff employment).

OR, (crude) odds ratio; AOR, adjusted odds ratio; LLCI/ULCI, lower/upper limit of the 95% confidential interval.

\*p<0.05.

likely to experience service contraction (AOR= 1.49). The home visiting service was significantly less likely to have either client cancellations (AOR=0.70) and service contraction (AOR=0.72) than adult day services.

**Impact on Client Numbers and Revenue**

Table 3 shows the effects of client cancellations and service contracts on user numbers and revenue for each service. We observed no significant changes in the number of institutional care users but did observe significant revenue decreases related to client cancellations (b = -0.014) and service contraction (b = -0.019) in institutional LTC providers. Home care showed a significant decrease in the number of users (b = -0.057) and income (b = -0.049) related to service contraction.

In the adult day service, service contraction was associated with changes in user numbers (b = -0.091) and revenue (b = -0.071). We observed no significant changes in the short stay service. While the mean number of home visiting service users increased (+0.5%), service contraction was associated with a significant reduction in revenue (b = -0.034).

**DISCUSSION**

Home care was more likely to experience reduced usage than institutional care. It is difficult to suspend services for clients in an LTC facility and move them back to their homes or to another facility. In addition, clients in institutional care facilities had lower activities of daily living (ADLs) than those using home care; thus, it may have been difficult for them to postpone their admission and continue home care. This may have prevented reduced institutional usage especially that associated with client cancellation. We estimated that reduced institutional usage reduced revenues by 1.4%–1.9%. This was lower than that for home care, and reduced usage was assumed to occur in a limited number of patients.

In this study, 72% of home care providers experienced client cancellations, a rate significantly higher than that for institutional services. Although the government did not recommend avoiding the use of home-based services in general, clients may have perceived that the risk of infection from home care services exceeded the benefits of using them. In addition to health anxiety and risk to loved ones, regular media use and social media use were identified as predictors of fear related to COVID-19.<sup>17)</sup> While the media are critical for conveying information to the public and promoting

**Table 3.** Changes in the number of users and revenue depending on usage restrictions by service

Predictor		Change rate in the number of users				Change rate in revenue			
		n	Mean ± SD	b	95% CI	n	Mean ± SD	b	95% CI
Institutional	Total	2,353	-0.013 ± 0.864			2,569	-0.010 ± 0.092		
	Client cancellations	735	-0.018 ± 0.849	-0.010	-0.023, 0.003	805	-0.024 ± 0.105	-0.014*	-0.022, -0.006
	Service contraction	893	-0.012 ± 0.878	0.003	-0.008, 0.015	983	-0.025 ± 0.107	-0.019*	-0.026, -0.011
Home care	Total	2,150	-0.040 ± 0.728			2,520	-0.040 ± 0.172		
	Client cancellations	1,573	-0.045 ± 0.726	-0.011	-0.037, 0.016	1,816	-0.046 ± 0.177	-0.014	-0.029, 0.001
	Service contraction	907	-0.074 ± 0.718*	-0.057*	-0.081, -0.034	1,062	-0.068 ± 0.186	-0.049*	-0.062, -0.035
Adult day	Total	776	-0.098 ± 0.781			844	-0.094 ± 0.175		
	Client cancellations	592	-0.104 ± 0.772	-0.013	-0.049, 0.023	646	-0.101 ± 0.178	-0.025	-0.053, 0.002
	Service contraction	342	-0.149 ± 0.789	-0.091*	-0.122, -0.061	365	-0.135 ± 0.195	-0.071*	-0.095, -0.048
Short stay	Total	189	-0.089 ± 0.772			217	-0.035 ± 0.162		
	Client cancellations	99	-0.087 ± 0.793	0.002	-0.065, 0.069	111	-0.050 ± 0.195	-0.026	-0.070, 0.018
	Service contraction	99	-0.113 ± 0.751	-0.051	-0.116, 0.014	116	-0.048 ± 0.175	-0.026	-0.069, 0.018
Home visit	Total	1,185	0.005 ± 0.699			1,459	-0.009 ± 0.163		
	Client cancellations	882	0.000 ± 0.700	-0.018	-0.058, 0.022	1,059	-0.011 ± 0.165	-0.003	-0.022, 0.016
	Service contraction	466	-0.011 ± 0.682	-0.025	-0.061, 0.010	581	-0.030 ± 0.170	-0.034*	-0.052, -0.017

Multivariate linear regression analysis: clients' cancellation (=1, no=0) and service contraction (=1, no=0) as independent variables, adjusted for the service size. SD, standard deviation; CI, confidence interval.

\*p<0.05.

preventive behavior, information should be conveyed without sensationalism or disturbing images to avoid generating excessive fear.<sup>18)</sup> The World Health Organization has also recommended that individuals limit seeking information from the media to about twice a day.<sup>19)</sup> Additionally, service providers may have failed to adequately inform clients of the services' benefits and risks of service suspension. The purpose of LTC insurance is to provide health, medical, and welfare benefits for services necessary for clients to lead independent lives and maintain their dignity.<sup>20)</sup> In this study, service providers were concerned about a potential decline in ADLs (68.9% of respondents were concerned), fewer opportunities to go out and socialize (59.2%), cognitive function decline (58.1%), increased burden on family caregivers (57.3%), and physical inactivity (42.3%).<sup>16)</sup> Emerging evidence has shown that community-dwelling older adults experienced negative effects on anxiety, depression, sleep quality, and physical activity during the period of social isolation due to COVID-19.<sup>21)</sup> Insufficient communication on why home services are necessary and how they contribute to clients' health may have led to substantial underutilization. To avoid excessive client cancellations in future pandemics, it may be necessary to agree with clients and their families on the necessity and benefits of the regular use of home care services.

Among home care services, adult day services were more likely to experience reduced usage. Adult day service embeds social contact in its process.<sup>22,23)</sup> Because clients often stay in the same place and eat at the same time in adult day services, it may have been difficult to take measures to prevent infection. Furthermore, since clients of adult day services have lower care needs on an average than short stay service clients, adult day services may have been temporarily replaced by informal caregiving or perceived as less necessary. The average increase in the number of home visit service users suggests that some clients reduced their use of adult day services and replaced these services with home visit services. Service contraction was more likely to occur in short stay services; however, as they were mostly located in LTC institutions with residents at higher risks of severe illness, they adopted more stringent preventive measures.

The adult day service experienced the largest impact on user numbers and revenue following reduced usage. We estimated that service contraction caused a 12.0% decrease in user numbers and a 7.2% decrease in revenue. Since the average profit ratio is 3.1% for all LTC providers and 3.3% for adult day service,<sup>24)</sup> a revenue reduction exceeding 10% could be critical. In this study, 19.9% of respondents reported increased expenditures related to additional infection control materials/ equipment and working hours;<sup>16)</sup> thus, the impact on the profit ratio was likely greater. Home care providers are smaller enterprises than institutional care providers and

therefore are likely to have less financial capacity. Although the proportion of service contractions was lower than that of client cancellations, it was much higher than the proportion of infected cases among service providers and users, suggesting that services were contracted in a fairly precautionary manner. As the pandemic continues, there has been progress in infection control training, including standard precautions and stocking of infection prevention items in home services. These efforts should continue to ensure service continuity as much as possible during future pandemics.

This study was conducted with an emphasis on timeliness, which limited the representativeness of the sample. It was difficult to survey facilities in crisis situations or that were closed due to outbreaks. Nevertheless, the results of the survey of care managers<sup>16)</sup> also demonstrating that adult day services most commonly experienced service contraction, followed by short stay services and home-visiting services, suggests that this tendency is reliable.

The rates of change in client numbers and revenue are less reliable because the respondents were asked to retrospectively indicate the changes from the previous year. In addition, the rate of change was based on April data, while the usage restrictions were based on data at the time of the response (May 12–22); thus, there is a time gap. The results of this study should be followed up with further analyses of LTC insurance records and ongoing administrative survey data. Prolonged reduced usage may cause deterioration of physical and psychological outcomes, regardless of the COVID-19 situation. The potential long-term impact on the older population requires further investigation. In addition, the data did not include the condition of the affected clients (e.g., care level). This topic also requires further exploration as older people with higher care levels may be more vulnerable to the negative effects of service reduction.

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**CONFLICT OF INTEREST**

The researchers claim no conflicts of interest.

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**AUTHOR CONTRIBUTION**

Conceptualization, MK, SH; Data curation, HM, SH; Investigation, MK, SH; Methodology, HM; Project administration, MK, SH; Supervision, MK, SH; Writing-original draft, HM; Writing-review & editing, MK, SH, and HM.

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