

# Chapter 5

## Predictors of Care-need Level Deterioration in Day Services

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#### **Day services in Japan**

In Japan's LTCI, 'day service' is one of the home-based services, but it is differentiated from 'day care rehabilitation'. Both 'day service' and 'day care rehabilitation' are designed for older people who still live at home and can regularly come to the service facilities. The major difference between them is the requirement of a medical prescription issued by a medical doctor. 'Day service' clients are not required to get a prescription before using the services. We will discuss 'day care rehabilitation' in the next chapter.

The aim of the day service is to maintain or improve people's function of living in their homes (Ministry of Health, Labour and Welfare of Japan, 2017b). The clients receive nursing care such as bathing, toileting, and physical exercise there, but these facilities are not designed to provide sleepover services. Basically, day service facilities provide a means of transport to pick up and drop off users from their homes to each facility. The service is expected to encourage the clients to go out of their homes, keep social connectedness, and avoid feelings of isolation.

#### **Methods**

##### **Data sources**

This study used data from the national long-term care insurance claims database from 1 April 2012 to 31 May 2015, and the Survey of Institutions and Establishments for Long-term Care from 2013 to 2015 (Ministry of Health, Labour, and Welfare of Japan, 2016). We linked these two databases by unique identifiers of facilities.

We further used data on death records from the Vital Statistics Survey (The Ministry of Health, Labour, and Welfare of Japan, 2018) to link to the claims data using identifiers: gender, birth date, death date (date of becoming ineligible for an LTCI beneficiary in the claims data), and municipalities.

##### **Study population**

We included participants aged 65 years or older who had a care-need level from 1 to 5 and started to use day services for at least three consecutive months between 1 October 2012 and 31 May 2015.

We excluded (1) participants with care-support levels 1 to 2 and care-need level 5 at the month of starting the service use; (2) those who concomitantly used day care rehabilitation for three months; (3) those who concomitantly used more than two day service facilities; (4) those who deteriorated in their care-need level within three months.

## Outcome

The primary outcome was the time to the first deterioration in the care-need level.

## Independent variables

We selected several LTCI items for additional payments as the key independent variables. If the LTCI claims enrolled in the study requested the payment of those selected items in the same month as or within three months after the day service use, we took such cases in this analysis as cases provided with the designated services. **Table 9** displays the items and requirements of the additional payments in day services we used in the study. We excluded the items about caring for people with early-onset dementia and those living in mountainous regions. The item of 'strengthening services provision system' consists of two categories, and service providers can claim reimbursement for either of these two categories.

As described in the previous chapters, 'additional payment' in Japan's LTCI fee schedule has two categories. One consists of items to appraise the special care provided due to clients' needs and the other appraises the service providers' initiatives regarding the management system.

We used individual-specific and provider-specific variables to adjust the characteristics of the clients and providers in the multivariate analysis. The individual-level variables were age, sex, the care-need level at the time of enrolment, and other LTC services used within six months before the use of the day service. The provider-level variables were the type of service provider (profit versus non-profit), location (central city of a metropolitan area or not), and scale of the facility (small, medium, or large).

## Statistical analysis

We first carried out a descriptive analysis of the participants' characteristics and additional payments by outcome status.

We examined the association between additional payments for day services and the first deterioration in the care-need level using a multivariable competing-risk Cox proportional hazards model. The occurrence of death was treated as a competing risk with the first deterioration in the care-need level, and the end of observation was defined as the date 24 months after the study entry. Cluster-robust standard errors were used to account for within-facility correlations.

The level of statistical significance was checked at 0.05 (two-tailed). All statistical analyses were conducted using Stata version 15.

## Results

**Figure 3** shows a flow diagram of the participant selection process. We identified 904,936 participants who had a care-need level from 1 to 5 and started to use day services for at least three consecutive months. Amongst these participants, 788,194 participants at 40,082 facilities were included in this study.

**Table 10** summarises the participants' characteristics and additional payments by outcome status. During the maximum 24-month follow-up period, 341,351 (43.3%) participants had points of deterioration in their care-need level before any other events took place, 71,831 (9.1%) ended with death, 375,012 (47.6%) were lost to follow-up or ended observation without care-need level deterioration or death. The mean (standard deviation) number of days to the first deterioration in care-need level, death, and becoming lost to follow-up or having ended the observation without another event were 299.4 (188.2), 299.8 (206.9), and 711.1 (99.0) days, respectively. **Table 11** shows the results of the multivariable competing-risk Cox proportional hazards regression model for the first deterioration in the care-need level. The additional payments of individual functional training 1, individual functional training 2, and strengthening system to provide services 2 were significantly associated with lower hazards for the deterioration in care-need level. In contrast, the additional payments of bathing care and functional assessment and intervention for oral cavities were significantly associated with higher hazards for the deterioration in care-need level.

## Discussion

This nationwide study examined the effect of special care of clients' needs and LTC-providers' initiatives, which were appraised as additional payments by the LTCI system, on the first deterioration in the care-need level. The results can be interpreted that assigning full-time functional training instructors and providers' initiatives and where the percentage of care workers who have worked more than three years is 30% or more were significantly associated with lower hazard for the first deterioration in the care-need level.

The participants who received functional training from full-time trainers to increase their motivation for living or to improve their functional abilities were associated with a lower hazard for the deterioration in the care-need level compared with those who did not receive such training. Generally, the type of functional impairments of older people in the community varies. Thus, individual training may be more effective for the prevention of deterioration in the care-need level than training with uniform content for day services.

With regard to the provider initiatives, the management system where the proportion of workers who had worked more than three years was 30% or more was significantly associated with lower hazard for the deterioration in the care-need level. A large amount of experience for the care of older participants may be associated with a better quality of care in day services.

In contrast, participants who received special care for bathing or functional assessment and intervention for oral cavities were associated with a higher hazard for deterioration in the care-need level. This association may be interpreted based on the fact that participants who received such care had a lower functional ability compared with those who did not receive the care. Bathing care was more likely to be provided for participants who required assistance with other daily living tasks as well as bathing. Similarly, the special oral cavity care function can only be provided for participants whose oral cavity function is impaired. Such impaired oral function is caused by severe chronic conditions in many cases, so it is likely to be associated with deterioration of the care-need level.

**Table 9. Items and Requirements for Additional Payments for Day Services**

<b>Items</b>	<b>Requirements determined by the Ministry of Health, Labour and Welfare of Japan</b>
<b><i>Additional payments for individuals' special care</i></b>	
Individual functional training 1	Assign at least one full-time functional training instructor (physical therapist, occupational therapist, nurse, etc.) throughout the hours of service-provision and provide functional training based on the plans individually created by the multi-professional team.
Individual functional training 2	Assign at least one full-time functional training instructor (physical therapist, occupational therapist, nurse, etc.) to be engaged in functional training and to provide functional training based on the plans individually created by the multi-professional team.
Functional assessment and intervention for oral cavities	Provide instructions for mouth cleaning and eating for patients who are at risk of decreasing oral cavity functions.
Nutritional assessment and intervention	Provide nutritional assessment and intervention for participants who are at risk of undernutrition.
Bathing care	Provide bathing care.
<b><i>Additional payments for provider initiatives</i></b>	
Improvement of working conditions	Implement a detailed plan regarding the improvement of working conditions for care workers.
Strengthening services provision system 1	Certified care workers account for 40% of all care workers.
Strengthening services provision system 2	Workers who have worked more than three years account for 30% of all staff.

Source: Abe (2015) (translated by the authors).

**Table 10. Participants' Characteristics and Additional Payments by Outcome Status for Day Services**

Variables	Deterioration in care-need level  n = 341,351 (%)	Death  n = 71,831 (%)	Lost to follow-up or end of observation  n = 375,012 (%)	Total  N= 788,194(%)
Age (years)				
65–74	35,063 (38.08)	6,125 (6.65)	50,883 (55.26)	92,071 (100)
75–84	139,325 (42.16)	25,636 (7.76)	165,530 (50.09)	330,491 (100)
85–94	152,105 (45.27)	35,112 (10.45)	148,795 (44.28)	336,012 (100)
≥95	14,858 (50.16)	4,958 (16.74)	9,804 (33.1)	29,620 (100)
Male	119,332 (44.26)	35,186 (13.05)	115,073 (42.68)	269,591 (100)
Care-need level				
1	209,016 (51.03)	23,007 (5.62)	177,554 (43.35)	409,577 (100)
2	86,945 (41.92)	19,576 (9.44)	100,867 (48.64)	207,388 (100)
3	33,171 (32.25)	14,675 (14.27)	54,994 (53.48)	102,840 (100)
4	12,219 (17.87)	14,573 (21.31)	41,597 (60.82)	68,389 (100)
<b>Additional payments for individuals' special care</b>				
Individual functional training 1	53,641 (42.02)	10,988 (8.61)	63,037 (49.38)	127,666 (100)
Individual functional training 2	73,105 (40.53)	14,497 (8.04)	92,791 (51.44)	180,393 (100)
Bathing care	270,111 (44.95)	60,435 (10.06)	270,325 (44.99)	600,871 (100)
Nutritional assessment and intervention	119 (45.77)	22 (8.46)	119 (45.77)	260 (100)
Functional assessment and intervention for oral cavities	8,874 (43.79)	1,778 (8.77)	9,615 (47.44)	20,267 (100)
<b>Additional payments for provider initiatives</b>				
Strengthening services provision system 1	80,210 (44.31)	17,053 (9.42)	83,755 (46.27)	181,018 (100)
Strengthening services provision system 2	105,775 (43.8)	22,907 (9.49)	112,788 (46.71)	241,470 (100)
Improvement of working conditions 1	3,936 (44.29)	885 (9.96)	4066 (45.75)	8,887 (100)
Improvement of working conditions 2	3,130 (42.49)	715 (9.71)	3,521 (47.8)	7,366 (100)
Improvement of working conditions 3	286,504 (43.47)	60,600 (9.2)	311,915 (47.33)	659,019 (100)

Note: The denominators of the percentage of each item are the total number of service users who belong to a specific demographic group, i.e. in the row 'Age 65–74', the denominator is 92,071.

Source: Compiled from Japan's LTCI claims by the authors.

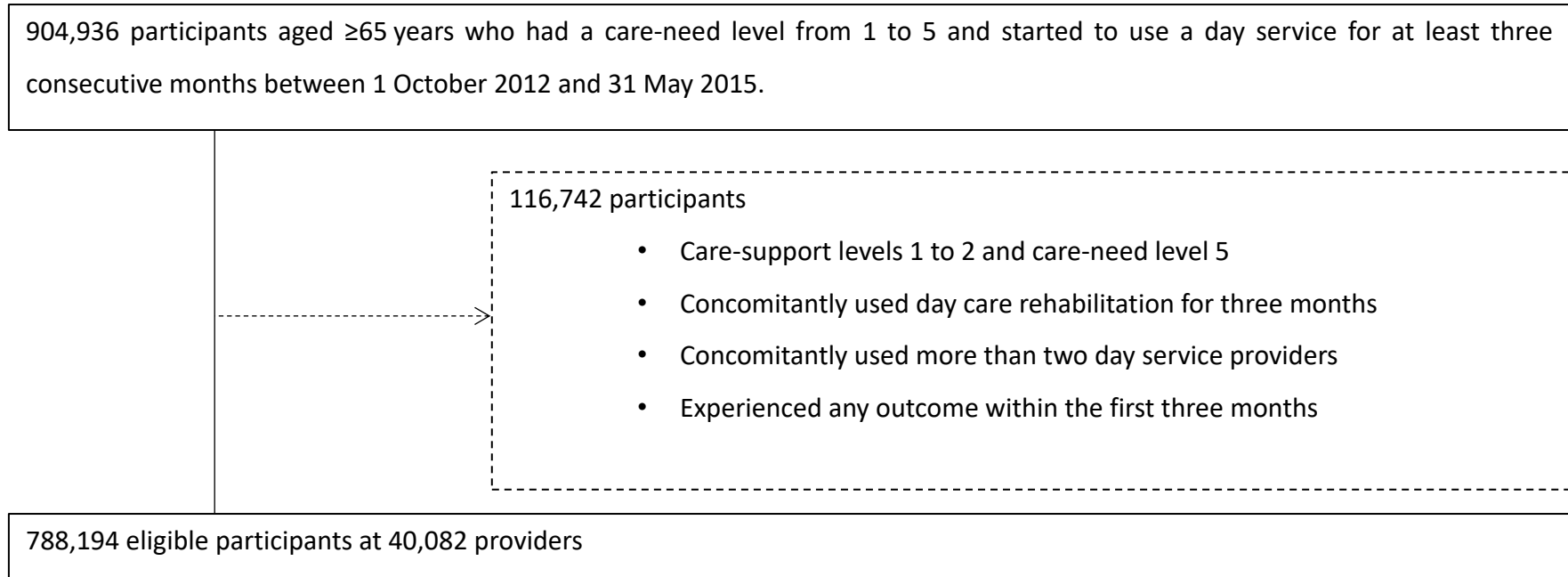
**Table 11. Multivariable Competing-risk Cox Proportional Hazards Regression Analysis for Care-need Level Deterioration in Day Services**

Factor	Subdistribution hazard ratio (95% confidence interval)	P-value
<b><i>Additional payments for individuals' special care</i></b>		
Individual functional training 1	0.936 (0.927 to 0.945)	<.001
Individual functional training 2	0.920 (0.912 to 0.928)	<.001
Bathing care	1.426 (1.414 to 1.439)	<.001
Nutritional assessment and intervention	1.206 (0.999 to 1.457)	0.05
Functional assessment and intervention for oral cavities	1.056 (1.034 to 1.079)	<.001
<b><i>Additional payments for provider initiatives</i></b>		
Strengthening services provision system 1	0.992 (0.983 to 1.001)	0.09
Strengthening services provision system 2	0.972 (0.963 to 0.981)	<.001
Improvement of working conditions 1	1.008 (0.975 to 1.041)	0.65
Improvement of working conditions 2	0.966 (0.931 to 1.001)	0.06
Improvement of working conditions 3	1.000 (0.99 to 1.01)	0.98

Note: The estimates were adjusted for patient and provider-level characteristics. The occurrence of death was defined as a competing risk with the first deterioration in the care-need level.

Source: Compiled from Japan's LTCI claims by the authors.

**Figure 3. Flow Diagram of the Participant Selection Process (day services)**



Source: Compiled from Japan's LTCI claims by the authors.