Chapter 6

Predictors of Care-need Level Deterioration in Day Care Rehabilitation

October 2020

This chapter should be cited as

Study Member (2019), 'Predictors of Care-need Level Deterioration in Day Care Rehabilitation', in Tamiya, N., H.Yasunaga, X.Jin, K.Uda and O.Komazawa (eds.), *Outcomes of Long-term Care Insurance Services in Japan: Evidence from National Long-term Care Insurance Claim Data.* ERIA Research Project Report FY2020 no.13, Jakarta: ERIA, pp.34-40.

Chapter 6

Predictors of Care-need Level Deterioration in Day Care Rehabilitation

Day care rehabilitation in Japan

In Japan's LTCI, day care rehabilitation is defined as a service for LTC beneficiaries who still live at home, aimed at functional recovery training and the training of activities for daily living (Ministry of Health, Labour and Welfare of Japan, 2017a). This service is provided by specialised staff, such as physical therapists or occupational therapists. The services are provided at long-term care health facilities, medical clinics, and hospitals etc. where the clients commute to receive the services.

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 using unique identifiers of the facilities.

We further used data on death records from the Vital Statistics Survey to link to the claims data using identifiers: gender, birth date, death date (date of becoming ineligible as an LTCI beneficiary in the claims data), and the municipality of residence.

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 care rehabilitation 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 in the initial month of day care rehabilitation use; (2) those who concomitantly used day services for three months; (3) those who concomitantly used more than two day care rehabilitation facilities; (4) those who first deteriorated in their care-need level within three months; (5) those who did not receive individual rehabilitation services; and (6) those who needed medical care such as mechanical ventilation or enteral nutrition.

Outcome

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

Independent variables

We used the LTCI service items categorised as additional payments as the key independent variables of this analysis. Amongst such items in the fee schedule of the LTCI, we excluded the following items from this analysis: 'caring for people with early-onset dementia', 'caring for those living in mountainous regions', and 'intensive staffing of rehabilitation therapists for short-time users'. If the LTCI claims used in this study requested the payment of service items included in this analysis in the same month as or within three months after day care rehabilitation use, we took such cases in this analysis as those provided with the designated services. **Table 12** shows the items and requirements for the additional payments in day care rehabilitation used in the study.

We used individual-level and provider-level variables to adjust the characteristics of the participants and providers. The individual-level variables were age, sex, care-need level at the baseline, and other LTC services used within the six months before the use of the day care rehabilitation. The provider-level variables were facility type (hospital versus long-term care health facility), management agency (profit versus non-profit), location (central city of a metropolitan area or not), and the scale of the facility (small, medium, or large).

Statistical analysis

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

We examined the association between additional payments in day care rehabilitation 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 4 shows a flow diagram of the participant selection process. We identified 315,446 participants who had a care-need level from 1 to 5 and started to use day care rehabilitation for at least three consecutive months. Amongst these participants, 209,384 patients at 6,564 providers were eligible for this study.

Table 13 summarises participants' characteristics and additional payments by the outcomes. During the maximum 24-month follow-up period, 77,532 (37.0%) participants had points of

deterioration in their care-need level, 18,478 (8.8%) ended with death, 113,374 (54.1%) were lost to follow-up or ended observation without event. The mean (standard deviation) number of days to the first deterioration in the care-need level, death, and becoming lost to follow-up or ending observation without event were 302.2 (191.2), 320.7 (206.8), and 714.6 (89.1) days, respectively.

Table 14 shows the results of the multivariable competing-risk Cox proportional hazards regression model for the deterioration in the care-need level.

The additional payments for short and intensive rehabilitation and home visiting were significantly associated with lower hazards for the deterioration in the care-need level. In contrast, additional payments for dementia care, bathing care, and functional assessment and intervention for oral cavities were significantly associated with higher hazards for the deterioration in the care-need level.

Discussion

This nationwide study examined the effect of special care responding to clients' need and providers' initiatives to improve the quality of day care rehabilitation on the deterioration in the care-need level. The results show that the special care of intensive rehabilitation within three months after being discharged home from a hospital, or the date of certification of the care-need level or home visiting by rehabilitation staff to create rehabilitation planning, were significantly associated with a lower hazard for the deterioration in the care-need level.

Participants who received intensive rehabilitation within three months after being discharged home, or the date of certification of their care-need level, were associated with a lower hazard for deterioration in the care-need level compared with those who did not receive it. In the early phases of care transition, older people are generally vulnerable to declines in their daily living activities. Intensive rehabilitation may be effective to prevent these declines amongst older people.

Participants who received home visiting for rehabilitation planning were associated with a lower hazard for deterioration in the care-need level compared with those who did not receive it. Because the tendency for the home environment to hinder participants' activities varies, individualised rehabilitation programmes for home visiting by rehabilitation staff may be effective in maintaining or improving their activities.

In contrast, the LTCI claims for the items of 'short and intensive dementia care and rehabilitation', 'bathing care', and 'functional assessment and intervention for oral cavities' were associated with higher hazards for deterioration in the care-need level. This association may be interpreted based on the fact that participants who received such care had lower functional abilities compared with those who did not receive the care. Bathing care was more likely to be provided for participants who required assistance with bathing and other tasks for daily living. The special oral cavity function care was also more likely to be provided for participants who had risk factors for lower oral cavity functions and other tasks for daily living.

Table 12. Items and Requirements for Additional Payments in Day Care Rehabilitation

Items	Requirements determined by the Ministry of Health, Labour and Welfare of Japan
Additional payments for individuals' special care	
Short and intensive rehabilitation	Provide individual rehabilitation within three months after being discharged home from hospital or the date of certification of the care-need level.
Short and intensive dementia care and rehabilitation	Provide individual rehabilitation for clients with dementia within three months after being discharged home from hospital or the starting date of the day care rehabilitation services.
Functional assessment and intervention for oral cavities	Provide instructions for mouth cleaning and eating for clients who are at risk of decreased oral cavity functions.
Nutritional assessment and intervention	Provide nutritional assessment and intervention for clients who are at risk of undernutrition.
Bathing care	Provide bathing care.
Home visit to create a rehabilitation plan	Home visit by rehabilitation staff to create a rehabilitation plan.
Additional payments for provider initiatives	
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 60% of all care workers.
Strengthening services provision system 2	Workers who have worked for more than three years account for 30% of all staff.

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

Table 13. Participants' Characteristics and Additional Payments by Outcome Status for Day Care Rehabilitation

Variables	Deterioration in care-need level n = 77,532 (%)	Death n = 18,478 (%)	Lost to follow-up or end of observation n = 113,374 (%)	Total N = 209,384 (%)
Age (years)				
65–74	11,663 (32.77)	2,083 (5.85)	21,846 (61.38)	35,592 (100)
75–84	33,876 (36.45)	7,550 (8.12)	51,513 (55.43)	92,939 (100)
85–94	29,784 (39.28)	8,034 (10.6)	38,007 (50.12)	75,825 (100)
≥95	2,209 43.93)	811 (16.13)	2,008 (39.94)	5,028 (100)
Male	11,663 (32.77)	2,083 (5.85)	21,846 (61.38)	35,592 (100)
Care-need level				
1	41,983 (48.42)	4,825 (5.56)	39,899 (46.02)	86,707 (100)
2	21,691 (36.78)	4,996 (8.47)	32,291 (54.75)	58,978 (100)
3	9,997 (27.13)	4,284 (11.63)	22,570 (61.25)	36,851 (100)
4	3,861 (14.38)	4,373 (16.29)	18,614 (69.33)	26,848 (100)
Additional payments for individuals' special care				
Short and intensive rehabilitation	23,413 (30.81)	7,007 (9.22)	45,572 (59.97)	75,992 (100)
Nutritional assessment and intervention	212 (38.97)	57 (10.48)	275 (50.55)	544 (100)
Functional assessment and intervention for oral cavities	2,280 (39.04)	586 (10.03)	2,974 (50.92)	5,840 (100)
Short and intensive dementia care and rehabilitation	1,385 (43.07)	255 (7.93)	1,576 (49)	3,216 (100)
Bathing care	57,806 (37.8)	14,821 (9.69)	80,319 (52.51)	152,946 (100)
Home visiting to create rehabilitation plan	30,764 (36.31)	7,513 (8.87)	46,454 (54.83)	84,731 (100)
Additional payments for provider initiatives				
Strengthening services provision system 1	16,150 (37.69)	3,830 (8.94)	22,872 (53.37)	42,852 (100)
Strengthening services provision system s 2	52,229 (36.86)	12,665 (8.94)	76,818 (54.21)	141,712 (100)
Improvement of working conditions 1	974 (37.62)	228 (8.81)	1,387 (53.57)	2,589 (100)
Improvement of working conditions 2	1,418 (35.82)	385 (9.72)	2,156 (54.46)	3,959 (100)
Improvement of working conditions 3	62,728 (37.1)	15,154 (8.96)	91,199 (53.94)	169,081 (100)

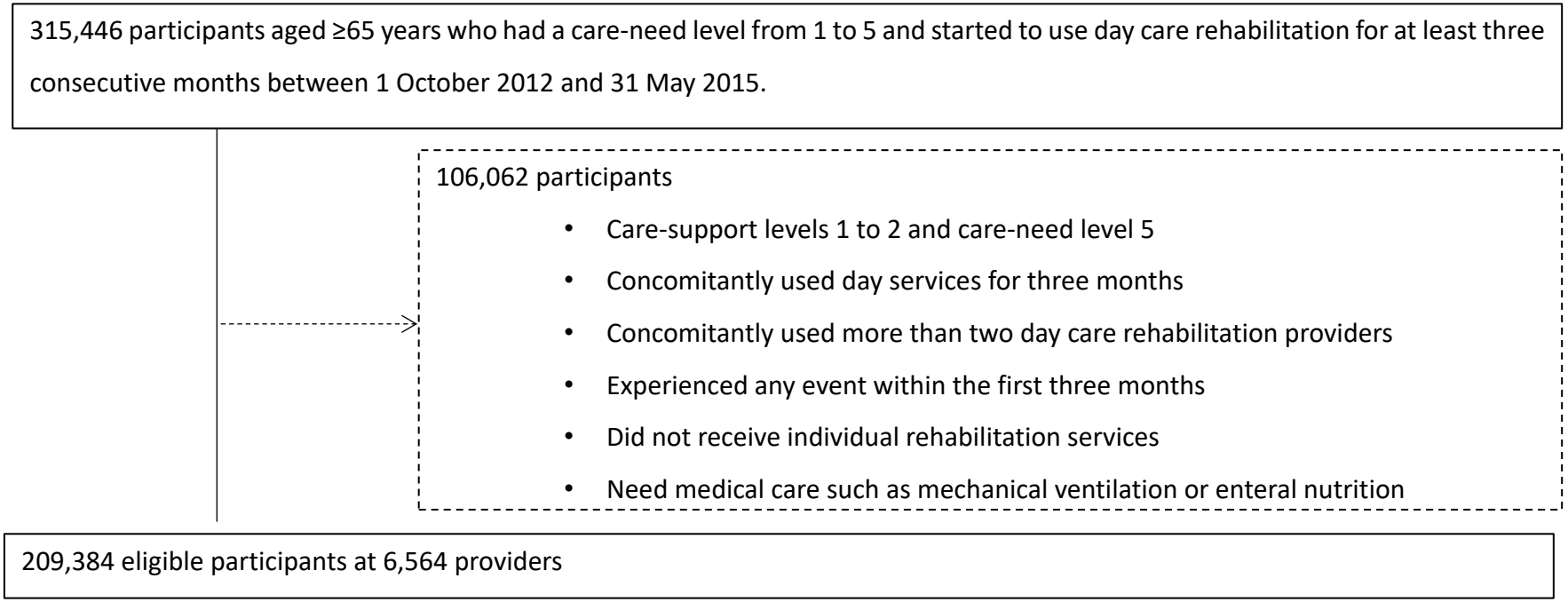
Note: The denominators of the percentage of each item are the total number of service users who belong to a specific demographic group, i.e. in the row 'Age 65–74', the denominator is 35,592.
Source: Compiled from Japan's LTCI claims by the authors.

Table 14. Multivariable Competing-risk Cox Proportional Hazards Regression Analysis for Care-need Level Deterioration in Day Care Rehabilitation

Factor	Subdistribution hazard ratio (95% confidence interval)	P-value
Additional payments for individuals' special care		
Short and intensive rehabilitation	0.863 (0.849 to 0.877)	<.001
Nutritional assessment and intervention	1.047 (0.914 to 1.2)	0.51
Functional assessment and intervention for oral cavities	1.103 (1.057 to 1.15)	<.001
Short and intensive dementia care and rehabilitation	1.149 (1.089 to 1.212)	<.001
Bathing care	1.353 (1.33 to 1.376)	<.001
Home visiting to create rehabilitation plan	0.982 (0.967 to 0.996)	.01
Additional payments for provider initiatives		
Strengthening services provision system 1	1.025 (0.999 to 1.052)	0.06
Strengthening services provision system 2	0.997 (0.974 to 1.02)	0.77
Improvement of working conditions 1	1.007 (0.944 to 1.075)	0.82
Improvement of working conditions 2	0.973 (0.921 to 1.028)	0.32
Improvement of working conditions 3	1.015 (0.994 to 1.036)	0.16

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 4. Flow Diagram of the Participant Selection Process (day care rehabilitation)



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