Chapter 4

Predictors of Care-need Level Deterioration in Long-term care Welfare Facilities

October 2020

This chapter should be cited as

Study Member (2019), 'Predictors of Care-need Level Deterioration in Long-term care Welfare Facilities', 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.17-26.

Chapter 4

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Long-term care welfare facilities

A long-term care welfare facility is a category of residential institution providing life services such as assistance with eating, bathing, dressing, and medication management. Compared to a long-term care health facility, which is designed as an intermediary facility between an acute-care hospital and the home, a long-term care welfare facility is not an institution for temporary accommodation but a permanent residential facility for older people as it focuses on life-long support and a social environment until the end of life. The LTCI regulates the eligibility of the residents of long-term care welfare facilities, and only older people who have higher needs for care (equal or higher than care-need level 3 after 2015) can be the residents in these facilities.

Methods

A time-to-event analysis was conducted using a national retrospective cohort. Data were obtained from national long-term care insurance claims and the Surveys of Institutions and Establishments for Long-term Care. People who started to stay in a long-term care welfare facility during the 2014 fiscal year were included. We included residents who were 65 years old or more and with a care-need-level certification from 1 to 4 (Figure 2).

Outcome

The primary outcome was the deterioration of the care-need level. Residents were followed for up to 24 months from admission. The time from admission into the facilities until the care-need-level deterioration was calculated in months. Only the time to the first care-need level deterioration was identified.

Independent variables

Additional payments

The additional payment fee items of the LTCI for appraising individuals' special care and facility initiatives were included to explore the association with care-need level deterioration. **Table 5** presents additional payment items and the relevant requirements in the long-term care welfare facilities.

Facility characteristics

Facility type (conventional care versus unit care), location (central city of a metropolitan area or not), and years in business were included. The staffing levels were measured as the number of staff in different specialties allocated per 100 residents, the proportion of RNs amongst all nurses, and the proportion of registered dietitians amongst all dietitians.

Covariates of resident characteristics

The age, sex, and care-need level of the baseline were measured as the control variables. These variables have been reported to have an effect on the outcome of the care-need level (Castle and Ferguson, 2010; Burge, Gunten, and Berchtold, 2013; Jin et al., 2018) in previous studies.

Statistical analysis

First, a descriptive analysis was conducted to review the distribution of the outcomes and the independent variables. A competing risk regression model was used for the analysis. Deterioration of the care-need level was treated as a primary outcome of interest and hospitalised and death as competing events. Due to the lack of information about the reasons for discharging residents from facilities, we regarded all residents who left the facilities as hospitalised or dead because , the main reasons for leaving long-term care welfare facilities were death (63.7%) and hospitalisation (28.9%) (Ministry of Health, Labour and Welfare of Japan, 2014). Subdistribution hazard ratios and the associated 95% confidence intervals were reported.

Table 5. Items and Requirements for Additional Payments in Long-term Care Welfare Facilities

Items	Requirements determined by the Ministry of Health, Labour and Welfare of Japan
Additional payment for individuals' special care	
Individual functional training	Provide functional training through a full-time functional training instructor according to the individual functional training plan.
Oral feeding support	Create plans for clients under tube feeding to promote oral intake in cooperation with multiple relevant professionals and implement the plans through registered dietitians.
Therapeutic meals	Provide the following therapeutic meals based on dietitians' instruction: diabetic diet, kidney disease diet, liver disease diet, stomach ulcer diet, anaemic diet, pancreatic disease diet, hypercholesterolemia diet, and gout diet.
Professional care for dementia	Provide care by staff who have completed specialised training related to dementia care in facilities where more than half of the residents have severe dementia.
Oral hygiene management	Provide oral care at least four times a month in facilities that are eligible for an 'oral hygiene management system', which is one of the facility-initiative based items for additional payment (see below).
Additional payment for facility initiatives	
Arrangement of full-time physician	Arrange for at least one full-time medical doctor.
Sufficient night-shift staffing	Arrange for more care workers or nurses at night than in night-shift staffing standards.
Nursing care system	Arrange for at least one full-time nurse.
Psychiatric care guidance	For facilities with more than 30% dementia residents, a psychiatrist provides consultation services and care guidance to the residents with dementia more than twice a month.
Nutrition management	A full-time registered dietitian creates and manages nutrition plans for residents individually.
Oral hygiene management system	Dentists or dental hygienists who follow a dentist's instructions give technical suggestions to nursing care staff about oral cavity care more than once a month.
Strengthening services provision system I	The proportion of certified care workers amongst care workers is more than 50%.
Improvement of working conditions	Implement a detailed plan regarding the improvement of working conditions for care workers.

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

Results

The endpoints of 38.6% of the residents enrolled in this study were care-need level deterioration, while 26.6% were hospitalised or died. Table 6 provides the descriptive statistics for the resident characteristics and outcomes.

Table 7 presents the distribution of the facility characteristics. Conventional facilities accounted for 66.2%, and 18.0% of the facilities were located in the central city of a metropolitan area. Most facilities took initiatives to get additional payments for the nursing system (95.2%), improvements in working conditions (88.8%), the nutrition management system (88.6%), and night shift arrangement (85.7%). Only 2.6% arranged for full-time medical doctors.

Table 8 shows the results of the competing risk regression. Female residents and those with a lower care-need level at the baseline were more likely to experience care-need level deterioration. Residents whose LTCI claims had 'oral feeding support' and 'oral hygiene management' were associated with earlier deterioration of the care-need level. Residents who were provided with therapeutic meals were likely to have slower deterioration of the care-need level.

At the facility level, residents who were accommodated in facilities which succeeded in achieving additional payments for the LTCI items of 'arrangement of full-time medical doctor', 'sufficient night-shift staffing', 'nutrition management', 'oral hygiene management system', and 'improvements in working conditions' were less likely to end with a deterioration of the care-need level. Facilities that provided unit-type services located in a central city of a metropolitan area and with a larger bed capacity were negatively associated with care-need level deterioration. A higher proportion of registered nurses amongst nurses and a larger number of occupational therapists per 100 users were associated with less deterioration.

Discussion

This study clarified that several facility initiatives and special care services for additional payments had an association with residents' care-need level deterioration.

Residents provided with therapeutic meals were less likely to deteriorate in their care-need level. There are relatively broad kinds of therapeutic meals, and the effects of specific diet therapy on individuals' functional status have been well documented (Lieber, 2003; Evert et al., 2014; Rysz et al., 2017). However, due to the lack of information regarding the conditions of the LTC beneficiaries, this study is unable to identify whether therapeutic meals have an effect on specific diseases. Residents whose LTCI claims showed they used special care for oral feeding support or oral hygiene management were more likely to deteriorate in their care-need level. A possible explanation is that the services were provided to patients who had difficulties in oral intake or had conditions that required oral care not only for the improvement of oral function but also for the prevention of pneumonia. Thus, residents with greater medical needs because of more severe chronic conditions were more likely to experience deterioration in their care-need level. Future studies that adjust for residents' clinical conditions are needed to clarify the effect.

Residents in facilities that arranged full-time medical doctors were less likely to deteriorate in their care-need level. In long-term care welfare facilities, one visiting physician is a minimum requirement, and most facilities only allocated a visiting physician. Earlier research has reported that a full-time physician might be more aware of the residents' medical history and laboratory results than a part-time physician (Takezako et al., 2007). Long-term care welfare facilities provide end-of-life care, and the care-need level is closely linked to the dignity of the institutionalised older people. This result can suggest that full-time physicians affiliated with long-term care welfare facilities will be in great demand.

Residents in facilities providing unit-type services were less likely to deteriorate in their care-need level than those with conventional types of services. One possible explanation is the higher quality of unit-type care than the conventional type. Conventional care is mainly provided in a shared room setting. In contrast, unit care is supposed to provide more person-centred care. One living unit accommodates a small number of residents (less than 10), and most facilities provide private room settings. A previous study reported the greater effect of person-centred care on keeping physical activity levels (Pirhonen et al., 2017). On the other hand, a previous study also reported that the relationship between unit-type care and lower care-need level deterioration may have been caused by economic status because unit-type services are more expensive and such facilities accommodate more residents who have a higher socioeconomic status (Jin et al., 2018). As is well known to all, a higher social economic status is related with better functional status in older people (Berkman et al., 2014).

Residents in facilities located in a central city of a metropolitan area were less likely to deteriorate in their care-need level. According to one study from the United States, rural facilities were less likely to provide mental health services and lacked accreditations or special care programmes (Kang, Meng, and Miller, 2011). A similar relation may be found in Japan because

shortages of medical staff are more serious in rural areas. Future studies are needed to identify the factors that might lead to disparities in long-term care between urban and rural areas.

Residents in large facilities (i.e. those having more than 60 beds) were less likely to result in care-need level deterioration. This association is well documented in hospital settings. It has been reported that staff in larger hospitals have greater experience and higher technical skill levels than those in small hospitals (Hentschker and Mennicken, 2018). The practice-makes-perfect theory may also be applied in nursing home settings.

Residents in facilities with higher proportions of RNs amongst the nursing staff were less likely to deteriorate in their care-need level. Our result is consistent with a previous study, and the possible explanation is that RNs serve as leaders and role models in the supervision of licensed practical nurses (Jin et al., 2018) and this improves the quality of services in the facilities.

Table 6. Participants' Characteristics and Additional Payments for Individuals' Special Care by Outcome Status in Long-term Care Welfare Facilities

	Deteriorated n=36,222		Died/hospitalised n=27,614		End of observation n=40,070		Total N=103,906	
	n	%	n	%	n	%		
Age group								
65–74	2,355	32.9	1,489	20.8	3,311	46.3	7,155	100
75–84	11,347	35.4	7,291	22.8	13,402	41.8	32,040	100
85–94	18,903	34.9	15,102	27.9	20,176	37.2	54,181	100
≥95	3,617	34.3	3,732	35.4	3,181	30.2	10,530	100
Sex								
Male	8,377	31.7	9,496	35.9	8,545	32.3	26,418	100
Female	27,845	35.9	18,118	23.4	31,525	40.7	77,488	100
Care-need level								
1	2,225	61.8	498	13.8	878	24.4	3,601	100
2	6,015	51.6	1,883	16.2	3,754	32.2	11,652	100
3	15,821	41.6	8,227	21.6	13,992	36.8	38,040	100
4	12,161	24.0	17,006	33.6	21,446	42.4	50,613	100
Additional payments for individuals' special care								
Oral feeding support	3,070	49.4	1,153	18.6	1,992	32.1	6,215	100
Therapeutic meals	4,294	34.1	3,404	27.1	4,877	38.8	12,575	100
Individual functional training	20,266	35.6	14,045	24.6	22,673	39.8	56,984	100
Oral hygiene management	2,703	36.8	1,696	23.1	2,944	40.1	7,343	100

Note: The denominators of the percentage of each item are the total number of residents who belong to a specific demographic group, i.e. in the row for 'Age 65–74', the denominator is 7,155.
Source: Compiled from Japan's LTCI claims by the authors.

Table 7. Additional Payments for Facility Initiatives and Baseline Characteristics of Long-term Care Welfare Facilities (n=6,638)

		n	%
Additional payments for facility initiatives			
	Nursing system	6,316	95.2
	Improvements in working conditions	5,893	88.8
	Nutrition management system	5,883	88.6
	Night shift arrangement	5,688	85.7
	Oral hygiene management system	3,792	57.1
	Psychiatric medical training	1,911	28.8
	Strengthening services provision system	794	12.0
	Arrangement of full-time medical doctor	172	2.6
Facility characteristics			
Facility type	Traditional	4,392	66.2
	Unit	2,246	33.8
Location	Central city of metropolitan area	1,198	18.0
Capacity	<100 beds	3,027	45.6
	>=100 beds	3,611	54.4
		Mean	SD
Years in business		16.25	13.0
Staffing level	Doctors per 100 users	0.32	0.3
	Dentists per 100 users	0.02	0.1
	Registered nurses per 100 users	3.15	2.1
	LPNs per 100 users	2.70	2.1
	RN/(RN + LPN)	0.54	0.3
	Caregivers per 100 users	45.70	13.1
	Certified care workers/caregivers	0.55	0.2
	Physical therapists per 100 users	0.16	0.4
	Occupational therapists per 100 users	0.11	0.4
	Speech therapists per 100 users	0.02	0.1
	Dietitians per 100 users	0.39	0.9
	Registered dietitians per 100 users	1.31	0.9
	Registered dietitians/dietitians	0.83	0.3

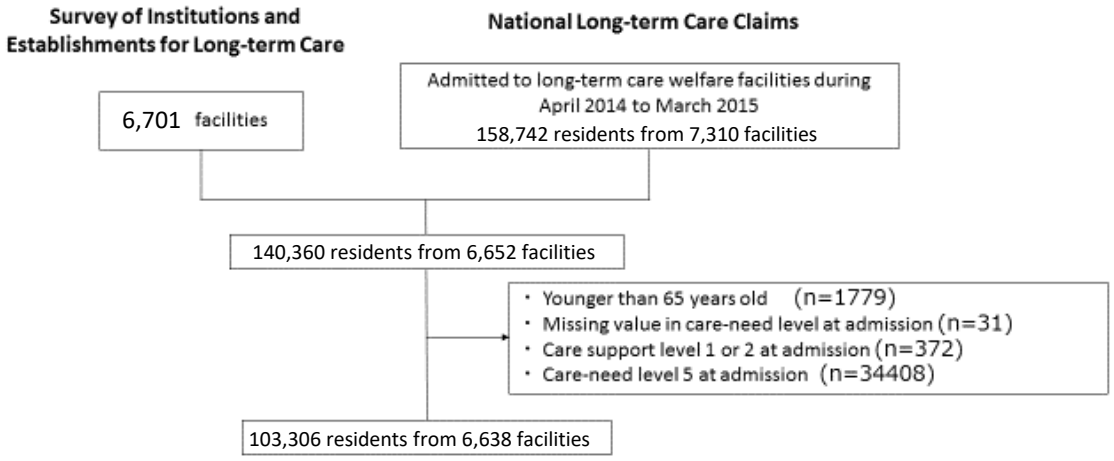
LPN = license practical nurse, RN = registered nurse.
Note: Part-time employee hours were converted to the numbers equivalent to full-time staff using the calculation method designated by the LTCI fee schedule.
Source: Compiled from Japan's LTCI claims by the authors.

Table 8. Multivariable Competing-risk Cox Proportional Hazards Regression Analysis for Care-need Level Deterioration in Long-term Care Welfare Facilities

	Subdistribution hazard ratio	95% CI		P-value
Individual level				
Additional payments for individuals' special care				
Therapeutic meals	0.96	0.93	0.99	0.017
Individual functional training	0.95	0.92	0.98	0.003
Oral feeding support	1.84	1.77	1.91	<0.001
Oral hygiene management	1.09	1.06	1.11	<0.001
Professional care for dementia	1.05	1.01	1.09	0.020
Facility level				
Additional payments for facility initiatives				
Full-time physician assignment	0.92	0.87	0.98	0.007
Night-shift assignments	0.99	0.96	1.03	0.669
Nutrition management	0.96	0.92	1.00	0.072
Oral hygiene management system	0.98	0.96	1.00	0.058
Improvements in working conditions	0.98	0.94	1.01	0.201
Facility characteristics				
Service type				
Unit (ref.: traditional)	0.91	0.89	0.94	<0.001
Central city of metropolitan area (ref.: not)	0.95	0.92	0.97	<0.001
Capacity >=60 beds (ref.: <60 beds)	0.94	0.92	0.96	<0.001
Staffing level				
RN/(RN + LPN)	0.93	0.90	0.97	<0.001
Number of occupational therapists per 100 users	0.96	0.94	0.99	0.011
Registered dietitians/dietitians	0.97	0.93	1.01	0.140

LPN = licensed practical nurse, RN = registered nurse.
Note: Estimates additionally adjusted for age, sex, and care-need level.
Source: Compiled from Japan's LTCI claims by the authors.

Figure 2. Flow Diagram of the Participant Selection Process (long-term care welfare facilities)



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