

# Safety and Quality of Care Evaluation in Japanese Long-Term Facilities Focused on the Activity Condition and Cognitive Function of Residents

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## Abstract

**Objective:** Currently, standards for evaluating long-term care facilities do not exist in Japan. This study aimed to evaluate the quality of healthcare services in Japan's long-term care facilities and identify the structural and process indicators associated with the facilities' outcome indicators. **Methods:** This retrospective study assessed changes in residents' abilities to participate in physical activities, their cognitive function, and their vulnerability to injuries. From 2012 to 2013, we collected information on the healthcare services at 1067 long-term care facilities registered with Japan's Welfare, Health and Medical Care Information Network in the Welfare and Medical Service Agency. We examined 12 structural indicators, 26 process indicators, and 7 outcome indicators. We used multivariate linear regression models adjusted to analyze relationships between outcome indicators and structural or process indicators. **Results:** Residents' activity and cognitive function indicators either improved by 80% - 90% or were maintained for one year. The Geriatric Functional Independence Measures, the Barthel Index, and holding conferences related to care were all considered activities of daily living. Three adverse events—tumbles and falls, behavioral problems, and aimless wandering or leaving the facility without permission—were factors that restricted residents' behavior and number of residents per care staff member. **Conclusions:** Maintaining or improving levels of independence and cognition in daily living requires a care process system that enables ongoing monitoring of residents' activities of daily living and cognitive functioning. Ensuring the safety of residents and improving the quality of care in long-term care facilities without securing adequate care staff are not possible.

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## Keywords

Activity Condition, Cognitive Function, Long-Term Care Facility, Safety, Quality of Care

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## 1. Introduction

Japan's long-term care insurance system was introduced in 2000. Although the supply of long-term care services has increased since that time, the quality of these services is currently of great concern. The number of residents in need of long-term care increased by 1.58 million in five years, from 4.49 million in 2010 to 6.07 million in 2015; this number is expected to continue to increase [1]. When the insurance system was introduced, there were approximately 9000 long-term care facilities (LTCFs) in Japan. By 2008, because of increased demand, there were approximately 11,000 LTCFs [2]. Since then, care facility growth has slowed down; despite this, there is a shortage of trained personnel available to work in these care facilities. Compared to other member countries of the Organisation for Economic Co-operation and Development, Japan's ratio of residents to nurses is high [3]. Ensuring consistent access to a reliable supply of safe, high-quality health care services has become a national priority, and reassessing the long-term care measures implemented in Japan in recent years is the first step toward that objective.

Other countries have actively implemented quality assessments of their long-term care services. In the United States, the quality of care in federally funded, certified nursing homes is objectively measured using its Minimum Data Set process to assess quality indicators [4]. Non-federally funded nursing homes have also confirmed quality improvements in the care they provide using these objective indicators and have achieved positive results [5]. In the UK, municipalities have used the performance assessment framework to evaluate improvements in the quality of services provided in nursing care facilities [6]. In Japan, assessments of residents' safety and the quality of long-term care facilities are currently limited to care service structures and processes which are primarily examined through administrative inspections conducted in accordance with legislated regulations [7]. Policies that would allow third-party institutions to assess outcomes have not been developed, and how health care services cause changes in residents' conditions is rarely examined.

Research on activities of daily living (ADL) maintenance has been conducted on elderly people who use long-term care insurance services. For example, the lower the level of social activities, the lower the ADL [8], and daily life patterns affect the maintenance of ADL [9]. Previous studies have explored the development of indicators which assess quality of care at nursing care facilities [10]; however, safety management practices and quality evaluations designed to clarify service outcomes related to structure and process have not been undertaken.

The purpose of this study was to assess the quality of safety management practices and care services of LTCFs. This was carried out by surveying changes in residents' conditions and the incidence of adverse events while focusing on residents' physical abilities and cognitive function. This study investigated outcome indicators such as changes in LTCF residents' physical abilities and cognitive functions and the occurrence of adverse events. It also aimed to clarify whether the structure and process indicators of LTCF care providers affected outcomes. Understanding the factors that contribute to these outcomes is key to improving the safety and quality of health care systems in LTCFs.

## 2. Materials and Methods

### 2.1. Setting

This retrospective study examined total care, healthcare, and medical care facilities for the elderly, as defined by Japan's long-term care insurance system. Total care facilities provide care for elderly people who will require permanent care, and for whom providing in-home care would be complicated by significant physical or mental decline. In contrast, healthcare facilities provide rehabilitation care after acute medical care, which is designed to enable residents to return home.

We randomly selected 6920 facilities from the LTCFs registered with the Welfare, Health, and Medical Care Information Network of the Welfare and Medical Service Agency. A questionnaire was mailed to the nurse managers or facility officers at the 1402 facilities that agreed to participate in this study.

### 2.2. Data Collection

We collected information on long-term care services at the facilities during the fiscal year 2012-2013. Based on the Donabedian framework, the questionnaire was composed of three parts: structural indicators, process indicators, and outcome indicators [11]. This study's structural indicators consisted of 12 items, including facility organization, personnel allocation, and standard care system characteristics of the facility. Process indicators consisted of 26 items, including the frequency with which risk assessments were conducted, conference enforcement status, and patient safety strategy implementation. Outcome indicators consisted of 7 items, including improving or maintaining the required level of care, improving or maintaining independence in daily living, improving or maintaining cognition in daily living, and improving or maintaining levels of incontinence in the year preceding data collection. Adverse events were documented as the frequency (per 100 residents in one facility) of falls or behavioral problems, such as harm to self or others, aimless wandering, or going out without permission. The definition and formula used to calculate the outcome indicators are summarized in **Table 1**.

The facility manager or nursing manager completed the questionnaire. We asked the facility manager for data on the 12 structural indices of the LTCFs and

**Table 1.** Definition of outcome indicators.

Outcome Indicators	Definition	Calculating Formula = numerator/denominator
1) Improving or maintaining the required care level	Ratio of residents whose level of need for long-term care per 100 residents was improved or maintained. Level 1: Residents who require partial care for some aspects of activities of daily living Level 2: Residents who require a low level of care Level 3: Residents who require a moderate level of care Level 4: Residents who require a high level of care. Level 5: Residents who require the highest level of care	=Number of residents whose level of need for long-term care improved or was maintained/Total number of residents × 100
2) Improving or maintaining independence in daily living level	Ratio of residents whose level of independence in daily living per 100 residents was improved or maintained. Level J: "I have some disability, but my daily life is almost independent, and I can go out alone by myself." Level A: Indoor life is largely independent, but the resident cannot go out without assistance. Level B: Indoor living requires some assistance. Life is spent mainly in bed during the day, but the resident can remain sitting. Level C: "I spend the whole day in bed and need assistance going to the bathroom, eating meals, and changing my clothes."	=Number of residents whose level of independence in daily living improved or was maintained/Total number of residents × 100
3) Improving or maintaining level of cognitive function in daily living	Ratio of residents whose level of cognitive function in daily living per 100 residents improved or was maintained. Level I: Although the individual has dementia, their daily life is independent at home and in society. Level II: Some symptoms interfere with daily life, but the individual is self-sustaining at home and outside, if others provide some attention. Level III: Symptoms interfere with everyday life, and daycare or nighttime care is necessary. Level IV: Frequent symptoms interfere with daily living, and the individual needs constant care. Level M: Significant psychiatric symptoms and problem behaviors are evident, and specialized medical treatment is necessary.	=Number of residents whose level of cognitive function in daily living improved or was maintained/Total number of residents × 100
4) Improving or maintaining management of incontinence	Ratio of residents with improved or maintained management of incontinence per 100 residents. Level 1: The individual can use a toilet or a portable toilet independently but needs someone to watch over them. Level 2: Some assistance is necessary when using toilets or portable toilets. Level 3: The resident cannot use the toilet so soils the floor. Level 4: The resident cannot use the toilet so uses diapers. Level 5: A catheter or stoma management is required.	=Number of residents whose incontinence was improved or maintained/Total number of residents who required assistance going to the bathroom × 100
5) Occurrence rates of tumbles and falls	Number of tumbles and falls per 100 residents in one year.	=Number of cases of tumbles and falls/Total number of residents × 100
6) Occurrence rates of behavioral problems such as harm to self or others	Number of residents with behavior problems such as inflicting harm to self or others per 100 residents in one year.	=Number of cases with behavior problems/Total number of residents × 100
7) Occurrence rates of aimless wandering and going out without permission	Number of cases with aimless wandering and going out without permission per 100 residents in one year.	= Number of cases with aimless wandering and going out without permission/Total number of residents × 100

the nursing managers for data on process and outcome indicators. We asked whether care was provided for the 26 process indicators.

### 2.3. Data Analysis

We calculated seven outcomes per 100 residents for each facility during the year preceding data collection as follows: maintaining or improving the required care level, independence in daily living, cognitive function in daily living, incontinence, the occurrence of tumbles and falls, behavioral problems such as harm to self or others, and the occurrence of aimless wandering or going out without permission. We compared the seven outcomes for each facility type using chi-square tests and Mann-Whitney  $U$  tests. We constructed multivariate linear regression models using a stepwise selection method to examine the relationship of each of the seven outcomes to the 12 structural indicators and the 26 process indicators.

Facility factors' influences were analyzed after statistical adjustment for facility type. Analyses were carried out using SPSS ver.24.0 for Windows, with the threshold of significance set at  $p < 0.05$ .

### 2.4. Ethics Approval and Consent to Participate

This study was conducted with the approval of the ethics committee of the Graduate School of Nursing of Nagoya City University (12024-2). Survey respondents were provided with a written explanation of the purpose of the study, informed that participation was voluntary, and advised that the data from all participating facilities would be published collectively, so that individual facilities would not be identifiable. Returning a completed questionnaire was considered to represent implied consent to participate in this study.

## 3. Results

### 3.1. Characteristics of Participating Facilities and Residents

Completed questionnaires were returned from 1402 facilities, with a response rate of 20.3%. Questionnaires with more than an 80% completion rate regarding the seven outcome indicators were accepted as valid responses; based on this criterion, 1067 facilities (76.1%) provided valid responses. Of these, 541 (50.7%) were total care facilities for the elderly, 324 (30.4%) were healthcare facilities for the elderly, and 202 (18.9%) were medical care facilities for the elderly. **Table 2** lists the characteristics of participating facilities.

The average number of residents per facility was 75.3, the average age of residents was 87.8 years, and 74.3% were women. Japan's long-term care insurance system has five levels of classification which are used to indicate the level of care required by residents. Based on this classification system, an average of 4.2% of facility residents were Level 1 residents who required partial care for some aspects of ADL; 16.4% were Level 2 residents and required a low level of care; 24.2% were Level 3 residents and required a moderate level of care; 26.8% were

**Table 2.** Characteristics of participating long-term care facilities ( $N = 1067$ ).

Variable	Category	$N$ (%)
Number of residents	<50	190 (17.8)
	50 - 100	547 (51.3)
	$\geq 101$	330 (30.9)
Location	Rural	570 (53.4)
	Urban	497 (46.6)
Funding type	Private	912 (85.5)
	Public	155 (14.5)
Facility type	Total care facility for the elderly	541 (50.7)
	Health care facility for the elderly	324 (30.4)
	Medical care facility for the elderly	202 (18.9)

Level 4 residents and required a high level of care; and 28.4% were Level 5 residents and required the highest level of care.

### 3.2. Occurrence of Outcome Indicators

In one year, 86.5% of the total care facilities, 83.3% of the healthcare facilities, and 91.1% of the medical care facilities maintained or improved their levels of care needs for their residents. Independence in daily living was maintained or improved in 86.0%, 88.5%, and 89.6% of the facilities, respectively. Cognitive levels in daily living were maintained or improved in 91.4%, 88.1%, and 96.2% of the facilities, respectively. There were significant differences between these indicators by facility type. Instances of incontinence were maintained or improved in 91.5%, 91.1%, and 92.5% of the facilities, respectively, and there were no significant differences among the facility types.

Adverse events, such as the occurrence of falls, were measured over a one-year period; per 100 residents, there were 120.2 reports of falls per a facility in total care facilities, 163.3 in healthcare facilities, and 47.0 in medical care facilities. The rate of behavioral problems was reported as 24.1, 11.7, and 13.3 per 100 residents, respectively. The rate of incidents of aimless wandering and going out without permission was reported as 11.6, 7.0, and 5.3 per 100 residents, respectively. There were significant differences among the facility types for all three indicators.

### 3.3. Performance of Structural and Process Indicators in LTCFs

**Table 3** displays structural and process indicators by facility type, number of care staff on-site, and the standard care systems in place to ensure patient safety. During the day, the average number of residents per care staff member was 2.5 in total care facilities, 3.7 in healthcare facilities, and 3.8 in medical care facilities. During the day, the average number of residents per nurse was 18.4, 9.3, and 6.9, respectively.

**Table 3.** Performance of structure and process indicators in long-term care facilities ( $N = 1067$ ).

	Total care Facilities $n = 541$	Healthcare Facilities $n = 324$	Medical Care Facilities $n = 202$
<b>Structural Indicators</b>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Number of residents in facility	70.4 (26.6)	83.9 (26.3)	51.4 (26.4)
Rate of capacity utilization (%)	97.9 (5.5)	93.8 (6.4)	91.7 (13.7)
Level of care required for residents in facility (%)			
Rate of level 1	2.2 (0.6)	6.1 (2.0)	1.7 (0.5)
Rate of level 2	9.5 (1.8)	16.9 (5.9)	7.1 (1.2)
Rate of level 3	21.2 (2.5)	24.5 (14.8)	28.0 (8.4)
Rate of level 4	30.2 (3.1)	25.8 (10.5)	30.8 (12.3)
Rate of level 5	37.0 (4.8)	26.9 ( 9.8)	32.5 (9.6)
<b>Human resources</b>			
Number of residents per doctor	415.0 (199.8)	74.7 (22.1)	28.6 (14.3)
Number of residents per nurse	18.4 (13.4)	9.3 (7.1)	6.9 (4.7)
Number of residents per care staff member	2.5 (2.0)	3.7 (2.6)	3.8 (2.8)
Number of residents per physiotherapist	235.7 (104.6)	27.6 (15.8)	35.3 (20.6)
Number of residents per facility staff member (office worker and volunteer)	58.2 ( 31.7)	24.3 (13.9)	25.4 (16.7)
<b>Process Indicators</b>	<i>n (%)</i>	<i>n (%)</i>	<i>n (%)</i>
Annual revision of manuals to enhance safety management measures	422 (78.0)	272 (84.0)	187 (92.6)
Summarizing and statistically analyzing concerning incidents once a month	355 (65.7)	254 (78.4)	154 (76.2)
Monthly analysis of background factors at the time of accidents	414 (76.6)	254 (78.4)	151 (74.7)
Making rounds to identify on-site risks every three months	262 (48.4)	161 (49.7)	112 (55.4)
Increasing staff awareness of appropriate actions and enhancing safety management every three months	320 (59.1)	211 (65.1)	150 (74.2)
Holding review meetings and seminars related to measures to enhance safety management every three months	276 (51.0)	161 (49.7)	125 (62.1)
Reviewing incidents of tumbles and falls every three months	329 (60.8)	249 (76.9)	128 (63.5)
Understanding ADL using indexes of FIM and BI every three months	125 (23.1)	163 (50.3)	96 (47.6)
Understanding cognitive condition using HADS and MMSE every three months	56 (10.3)	124 (38.4)	47 (23.4)
Holding care conferences for the maintenance and enhancement of ADL and cognitive condition every three months	289 (53.4)	281 (86.8)	148 (73.4)
Holding care conferences to reduce and/or better manage incontinence problems every three months	299 (55.2)	283 (87.3)	131 (64.7)
Keeping an incontinence diary for each resident	447 (82.7)	234 (72.2)	137 (67.6)
Changing diapers and prompting residents to better manage their incontinence	436 (80.5)	265 (81.7)	142 (70.3)
Persuading residents to use training pants or pads	501 (92.6)	308 (95.2)	162 (80.4)
Allocating a staff member to watch over residents while bathing	531 (98.1)	318 (98.2)	190 (93.9)
Reviewing oral medicines (e.g., sleeping tablets and psychotropic drugs) for residents at high risk of falls	339 (62.7)	218 (67.4)	99 (48.8)

**Continued**

Taking measures such as modifying clothes according to individual disabilities	176 (32.6)	81 (24.9)	46 (23.0)
Adjusting bed height and mattress hardness for easy bed-leaving	470 (86.9)	272 (83.8)	154 (76.4)
Encouraging the use of a nurse call system	452 (83.5)	284 (87.7)	142 (70.3)
Paying attention to putting wheelchairs and bed stoppers in position	509 (94.0)	307 (94.9)	195 (96.6)
Occasionally using a waist belt or a wheelchair table to prevent residents from slipping off wheelchairs	87 (16.1)	64 (19.8)	126 (62.2)
Using a protective device (e.g., hip protector, cushioning mats) for residents at high risk of falls	251 (46.4)	125 (38.6)	70 (34.5)
Using a bed-leaving sensor or a similar device for residents at high risk of falls	403 (74.5)	250 (77.2)	105 (52.0)
Putting mittens or gloves on residents to prevent them from removing tubes and damaging their skin	189 (34.9)	92 (28.4)	173 (85.8)
Occasionally restricting the range of activities of residents who wander aimlessly	78 (14.5)	47 (14.4)	75 (37.2)
Providing individual residents who can go out with opportunities to have a walk or outing	449 (83.0)	227 (70.1)	124 (61.5)

More than 80% of the care staff in all facility groups had processes of: persuading incontinent residents to use training pants or pads, allocating a staff member to watch over residents while they were bathing, and paying attention to how staff members positioned wheelchairs and bed stoppers.

Fewer than 50% of the care staff in all facility group engaged in the processes of: understanding the resident's cognitive condition using the Hospital Anxiety and Depression Scale (HADS) and the Mini-Mental State Examination test (MMSE) every three months; routinely modifying clothes to accommodate an individual's disabilities; using protective devices (e.g., hip protectors and cushioning mats) for residents at high risk of falls; and occasionally restricting the range of activities for residents who were likely to wander aimlessly.

### 3.4. Factors Related to Each Outcome Indicator across Facilities

**Table 4** lists the associations between process indicators and outcome indicators. Maintained or improved levels of long-term care needs were not related to structural or process indicators. Maintained or improved levels of independence in daily living were related to measuring ADL using indexes of FIM (functional independence measure) and BI (Barthel index) every three months ( $\beta = 0.20$ ,  $p < 0.001$ ), holding care conferences regarding the maintenance and enhancement of ADL and cognitive condition every three months ( $\beta = 0.18$ ,  $p < 0.001$ ), and providing individual residents who can go out with opportunities to have a walk or an outing ( $\beta = 0.09$ ,  $p = 0.004$ ). Maintained or improved cognitive levels in daily living showed a relationship to measuring ADL using indexes of FIM and BI every three months ( $\beta = 0.14$ ,  $p < 0.001$ ), measuring mental health by using HADS and MMSE every three months ( $\beta = 0.15$ ,  $p < 0.001$ ), holding care conferences for the maintenance and enhancement of ADL and cognitive condition every three months ( $\beta = 0.09$ ,  $p < 0.001$ ), and reviewing oral medicines (e.g., sleeping tablets and psychotropic drugs) used by residents at high risk of falls ( $\beta$



**Table 4.** Factors associated with outcome indicators across facilities ( $N = 1067$ ).

	$R^2$	$B$	$SE$	$\beta$	$p$
Improving or maintaining independence in daily living level	0.16				
Understanding ADL using indexes of FIM and BI every three months		0.52	0.13	0.20	<0.001
Holding care conferences for the maintenance and enhancement of ADL and cognitive condition every three months		0.44	0.11	0.18	<0.001
Providing individual residents who can go out with opportunities to have a walk or outing		0.38	0.11	0.09	0.004
Improving or maintaining cognitive function in daily living level	0.14				
Understanding ADL using indexes of FIM and BI every three months		0.56	0.14	0.14	<0.001
Understanding cognitive condition by HADS and MMSE every three months		0.44	0.13	0.15	<0.001
Holding care conferences for the maintenance and enhancement of ADL and cognitive condition every three months		0.28	0.10	0.09	<0.001
Reviewing oral medicines (e.g., sleeping tablets and psychotropic drugs) for residents at high risk of falls		0.48	0.15	0.10	0.001
Improving or maintaining incontinence behavior level	0.19				
Understanding ADL using indexes of FIM and BI every three months		0.44	0.16	0.11	<0.001
Keeping an incontinence diary for each resident		-0.54	0.14	0.14	<0.001
Holding care conferences for behavior enhancement of incontinence problems every three months		-0.68	0.25	0.06	0.002
Occurrence of tumbles and falls	0.22				
Number of residents per care staff member		0.06	0.02	0.19	<0.001
Number of residents per nurse		0.11	0.05	0.10	<0.001
Changing diapers and prompting residents to manage incontinence		-0.45	0.19	-0.08	0.003
Reviewing oral medicines (e.g., sleeping tablets and psychotropic drugs) for residents at high risk of falls		-0.44	0.14	-0.16	0.001
Occasionally using a waist belt or a wheelchair table to prevent residents from slipping off wheelchairs		-0.54	0.11	-0.20	<0.001
Occurrence of behavior problems such as harm to self or others	0.21				
Number of residents per care staff member		0.06	0.04	0.16	<0.001
Number of residents per nurse		0.12	0.06	0.07	<0.001
Putting mittens or gloves on residents to prevent them from removing tubes and damaging their skin		-0.51	0.10	-0.22	<0.001
Occurrence of aimless wandering and going out without permission	0.18				
Number of residents per care staff member		0.04	0.01	0.20	<0.001
Understanding cognitive condition by conducting HADS and MMSE every three months		-0.45	0.20	-0.09	0.001
Holding care conferences for the maintenance and enhancement of ADL and cognitive condition every three months		-0.59	0.19	-0.13	0.002
Occasionally restricting the range of activities of residents who wander aimlessly		-0.57	0.20	-0.11	<0.001

= 0.10,  $p = 0.001$ ). Maintained or improved management of incontinence was related to measuring ADL using indexes of FIM and BI every three months ( $\beta = 0.11$ ,  $p < 0.001$ ), keeping an incontinence diary for each resident ( $\beta = 0.14$ ,  $p < 0.001$ ), and holding care conferences for behavior enhancement of incontinence problems every three months ( $\beta = 0.06$ ,  $p = 0.002$ ).

The three adverse events—the number of falls, behavioral problems, and aimless wandering or going out without permission—all showed a similar relationship with the number of residents per care staff member ( $\beta = 0.19$ ,  $\beta = 0.16$ ,  $\beta = 0.20$ , respectively,  $p < 0.001$ ). Additionally, the three adverse events were positively related to factors that restricted residents' behavior: occasionally using a waist belt or a wheelchair table to prevent residents from slipping off wheelchairs, putting mittens or gloves on residents to prevent them from removing tubes and damaging their skin, and occasionally restricting the range of activities of residents who wander aimlessly.

#### 4. Discussion

This study clarified two critical points. Over one year, this study quantified and analyzed outcome indicators that included changes in LTCF residents' activities, cognitive function, and the occurrence of adverse events. The study then identified the independent predictors of outcome indicators using LTCFs structural and process indicators as they related to care providers and care systems.

Over the course of one year, seven outcome indicators were found to be related to residents' activities and cognitive function. A previous study reported that 75.3% - 84.4% of its participants improved or maintained the following four outcomes [10]: long-term care needs, independence in daily living, cognitive level in daily living, and ability to manage incontinence. This study's maintenance or improvement rates were slightly higher.

This study also identified the independent predictors of outcome indicators using structural and process indicators for facility management. In this study, the indication that residents had maintained or improved their level of independence in daily life showed a relationship with the understanding of ADL by FIM and BI, and the maintained or improved cognitive levels in daily living indicator showed a relationship with both measuring ADL by FIM and BI, and measuring cognitive conditions using HADS and MMSE. The maintained or improved management of incontinence showed a relationship with measuring ADL using FIM and BI indexes. Holding care conferences is a common factor in these outcomes. Therefore, changes in the levels of independence and cognitive functioning in daily life were influenced by holding conferences to assess residents' conditions using objective measures. These results suggest that maintaining or improving independence and cognition in daily living requires not only more staff but also a system of care that enables monitoring of residents' ADL and cognitive condition at any time. There was no relationship observed between changes in the level of long-term care needs and facility factors, structural indi-

cators, or process indicators. This was not possible to determine, however, since the changes would only have been shown if a facility had received a new certification during the investigation period. This limitation may have influenced the results.

In addition, the three adverse events demonstrated a relationship with factors that restricted residents' behavior as well as the number of residents per care staff member. Previous studies have shown that carefully assigning staff limits and holding periodic care conferences reduces the need to physically restrain residents [12]. Restricting residents' behaviors for reasons of safety due to shortages of care staff is an ethical issue. Without securing sufficient care staff at LTCFs, it is impossible to ensure the safety of residents and improve the quality of care.

This study may have been limited by its use of a retrospective design, which precludes drawing conclusions regarding causality. In addition, these findings were based on a low response rate to the survey by 1067 LTCFs and may not be generalizable to all LTCFs. In the future, empirical examinations of the changes in outcome indicators reported by LTCFs are needed.

## 5. Conclusion

This study found that, over one year, outcome indicators related to LTCF residents' activity levels and cognitive function were 80% - 90% improved or maintained. Relationships were found between understanding ADL and the use of FIM or BI indexes and holding care conferences. Our findings showed that the maintenance or improvement in independence and cognition in daily living requires a system of care that enables the ongoing monitoring of residents' ADL and mental condition. Further, the three adverse events—falls, behavioral problems, and aimless wandering and going out without permission—showed a relationship with restricting residents' behaviors and the number of residents per care staff member. It is impossible to ensure the safety of residents and improve the quality of care in LTCFs without first securing the necessary care staff.

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## Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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