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ORIGINAL ARTICLE

# Associations among the Nutritional Status and Mental/Physical Functions of Care-dependent Individuals Living in Residential Homes for the Elderly

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## ABSTRACT

This study examined the nutritional status and mental/physical functions of care-dependent individuals living in residential homes for the elderly, focusing on malnutrition as a leading cause of the progression of care dependency, to clarify the associations among them. A status survey was conducted, involving 147 care-dependent individuals living in 3 residential homes with care services for the elderly in Tokyo and Kanagawa. When focusing on physical functions, the Alb level was higher among residents exhibiting higher total ADL20 scores; based on this, approaches to prevent decreases in the nutritional status may be essential for the maintenance of ADL independence. This tendency was particularly marked when examining scores from the following ADL20 subscales: <indoor walking>, <ascending/descending stairs>, and <outdoor walking>, as the Alb level was higher among those who were able to perform these activities more independently. Regarding cognitive functions, the Alb level was lower when the total CDR score and scores from the following subscales indicated higher severity: <memory>, <orientation>, <judgment>, <social adaptation>, <family situation>, and <care situation>. This highlights the necessity of continuous nutritional management as a preventive measure against dementia. This study is suggesting the necessity of performing nutritional management, such as maintaining and restoring a favorable nutritional status in residential homes for the elderly lead a healthy and mentally and physically independent life.

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## I. Introduction

In Japan, residential homes with and without care services are currently available as private homes for the elderly. When using home care services based on the Long-term Care Insurance System, subsidies are allocated, corresponding to the category 'daily care for specific facility users'. In recent years, while delays in the construction of Long-term Care Insurance-covered facilities have been noted, the numbers of private (residential) homes for the elderly and their residents have steadily increased; the values, which were 276 and 30,792, respectively, in 2008, increased to 7,563 and 315,678, respectively, in 2013. On comparing the national mean Care Grade and that of insurance-covered facility users, the former is still lower, at 2.2, but grades 4 and 5 account for more than 25%, revealing the increasing demand of the elderly requiring care for such homes.

Residential homes for the elderly are regarded as new locations for the elderly to relocate from their long-lived-in homes (Toyama, 2014). Furthermore, it is expected that the homes will accommodate needs related to the comprehensive community-based care system as key to social insurance system reform to prepare for 2025, when all baby-boomers will be aged 75 or over. In such a situation, care approaches in these homes should be reviewed, covering the concept of 'private but unaccustomed homes, in addition to that of 'facilities'. Although some studies examined multi-professional collaboration in residential homes with care services for the elderly, involving their staff (Kakinuma, 2013), the actual situation of such homes with or without care services, including residents' conditions and the contents of care, has yet to be clarified. Furthermore, as the mean Care Grade on admission to residential homes for the elderly is lower than that in insurance-covered facilities, the length of residence in the former tends to be long, and a large number of the elderly chose to stay in such homes until the end of their lives. In line with this, care for residents showing steadily progressing age-related changes in their conditions, leading to the necessity of leading a daily life in the presence of multiple diseases occurring with time, or coping with cognitive impairment, is needed in these homes.

Malnutrition is regarded as a leading cause of the progression of care dependency. When the Long-Term Care Insurance Act was revised, nutritional management was added as a category of business activities to prevent care-dependency. According to an estimate based on the results of comprehensive evaluation of the outcomes of such activities (Tsuji, Ueda, Okubo et al., 2009) approximately 30% of elderly individuals with an increased risk of care-dependency require nutritional improvement.

To examine the nutritional status and mental/physical functions of care-dependent individuals living in residential homes with care services for the elderly, focusing on the former as a factor associated with care dependency and its progression, and to clarify the association between the former and latter.

## II. Methods

### 1. Study design

A quantitative, descriptive study (status survey)

### 2. Study period

November 2015 (30 days)

### 3. Subjects

Care-dependent individuals living in residential homes with care services for the elderly

### 4. Study items

- 1) Basic attributes : Sex , Age
- 2) Care grade
- 3) Nutritional status : dietary intake, albumin (Alb) level
- 4) Physical functions : Levels of ADL Independence of the Elderly with Disabilities ( J : outdoor walking level , A : indoor walking level , B : wheelchair level , C : bed level , ADL20 ( Activities of Daily Living 20)
- 5) Mental functions : Levels of ADL Independence of the Elderly with Dementia ( I : suspect level , II : attention level , III : sometimes care level , IV : all day care level , M : hospital level ) , CDR (Clinical Dementia Rating , CDR0.5 : suspected dementia , CDR1 : mild dementia , CDR2 : moderate dementia , CDR3 : severe dementia )
- 6) Status of hospital visits

### 5. Data collection

A questionnaire survey was conducted, asking home staff to provide copies of data related to residents.

### 6. Data analysis

The associations among the nutritional status and mental/physical functions of care-dependent residents were analyzed using SPSS Ver.22.0 as statistical analysis software.

## III. Ethical considerations

This study was conducted with the approval of the Ethics Committee of the Faculty of Health Care and Nursing, Juntendo University. Questionnaire responses were transcribed by home staff. In the process of transcription, the data were converted into IDs as a measure to prevent the identification of individuals.

#### IV. Results

Data related to 147 care-dependent individuals living in 3 residential homes with care services for the elderly in Tokyo and Kanagawa. There were 28 (19.0%) males and 119 (81.0%) females, with a mean age of 88.7±5.5. Their mean Care Grade was 3.13±1.64. The mean dietary intakes were 1230.0±304.4kcal. The mean Alb levels were 3.6±0.5g/dl. Ranks based on the Degrees of ADL Independence of the Elderly with Disabilities varied as follows: J: 6(4%), A: 74(50%), B: 51(35%), and C: 16(11%). The mean ADL20 score was 20.5±15.9/80, revealing their poor ADL independence. The results of the Degrees of ADL Independence of the Elderly with Dementia were as follows: I: 21(14%), IIa: 29(20%), IIb: 37(25%), IIIa: 21(14%), IV:16 (11%),M:4(3%). On assessment using the CDR, 24% of all cases were classified as mild (CDR-1) and severe (CDR-3) dementia, followed by suspected (CDR-0.5; 23%) and moderate (CDR-2; 20%) dementia; all severities of dementia were similarly observed (Table 1).

<Table 1> Basic Attributes of Care-dependent Elderly (n=147)

Sex	Males	28(19%)
	Females	119(81%)
Age		88.7±5.5
Care grade		3.13±1.64
Dietary intakes		1230.0±304.4kcal
Alb levels		3.6±0.5g/dl
Levels of ADL Independence of the Elderly with Disabilities	J	6(4%)
	A	74(50%)
	B	51(35%)
	C	16(11%)
ADL20 score		20.5±15.9/80
Levels of ADL Independence of the Elderly with Dementia	I	21(14%)
	II a	29(20%)
	II b	37(25%)
	IIIa	21(14%)
	IIIb	19(13%)
	IV	16(11%)
	M	4(3%)
CDR	CDR-0.5	34(23%)
	CDR-1	35(24%)
	CDR-2	29(20%)
	CDR-3	34(23%)



<Table 3> Results of Multiple Regression Analysis of the Alb Level and  
Mental/Physical Functions (n=147)

	Standardizing coefficient
CDR: <memory>	-.216*
ADL20: <indoor walking>	.177*
R <sup>2</sup>	.102
Adjusted R <sup>2</sup>	.089
F-value	8.080**
df	2

\* p &lt; 0.05    \*\* p &lt; 0.01

Stepwise method

## V. Discussion

On analyzing the associations among the nutritional status and mental/physical functions of care-dependent individuals living in residential homes for the elderly, with the Alb level as an index for the former, the level was lower among older residents, indicating the necessity of continuous nutritional management for individuals living for a long period in residential homes for the elderly.

When focusing on physical functions, the Alb level was higher among residents exhibiting higher total ADL20 scores; based on this, approaches to prevent decreases in the nutritional status may be essential for the maintenance of ADL independence. This tendency was particularly marked when examining scores from the following ADL20 subscales: <indoor walking>, <ascending/descending stairs>, and <outdoor walking>, as the Alb level was higher among those who were able to perform these activities more independently. This is consistent with the results of the researchers' previous study, in which the mobility and walking ability were suggested to influence the Alb level (Fujio, Ogawa, Inoue et al., 2016).

Regarding cognitive functions, the Alb level was lower when the total CDR score and scores from the following subscales indicated higher severity: <memory>, <orientation>, <judgment>, <social adaptation>, <family situation>, and <care situation>. This highlights the necessity of continuous nutritional management as a preventive measure against dementia. Approaches for appropriate hydration, nutrition, activities, and bowel movements have also been shown to be important as a part of basic care for individuals with dementia; in a study, symptoms of dementia markedly improved through workshops for the families of patients with dementia, adopting such basic care approaches (Kodaira & Takeuchi, 2015).

It was also revealed that residents with lower Alb levels visited hospitals more regularly, indicating the presence of some disease.

In the researchers' previous study, both medical and welfare service providers' awareness of care-dependent individuals' nutritional status was poor (Fujio & Kodaira, 2014), indicating the necessity of nutritional management may be indispensable.

## VI. Conclusion

This study is suggesting the necessity of performing nutritional management, such as maintaining and restoring a favorable nutritional status in residential homes for the elderly lead a healthy and mentally and physically independent life.

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