

Trial test of the "Itamikei", a pain meter and its ease of operation for clinical practice

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The purpose of this study was to develop the "Itamikei", a small machine which records the subjective level of pain between 0-10. In addition to testing its ease of operation and usefulness in the clinical practice environment.

The "Itamikei" is 23 cm x 6 cm x 2 cm. It weighs 160 grams. It has 11 buttons, relating to the 0-10 Numeric Rating Scale (NRS). Each time a button is pushed the level of pain is recorded, along with the time and date. Later, this data can be transferred to computer displayed graphically showing the patient's subjective level of pain.

This research was a case study for using the "Itamikei". One in-patient at the university hospital who had cancer pain was asked to use the "Itamikei" for 14 days. A graph was printed out and given to both the patient and the medical staff.

The results suggest the following:

1. Using the 0-10 NRS the patient could easily express her level of pain.
2. Because the "Itamikei" was easy to operate, the patient found no difficulty in entering her level of pain.
3. In graph form the daily transition in pain levels can be easily analyzed, and a program for managing pain can be prepared.



Figure 1. The "Itamikei"

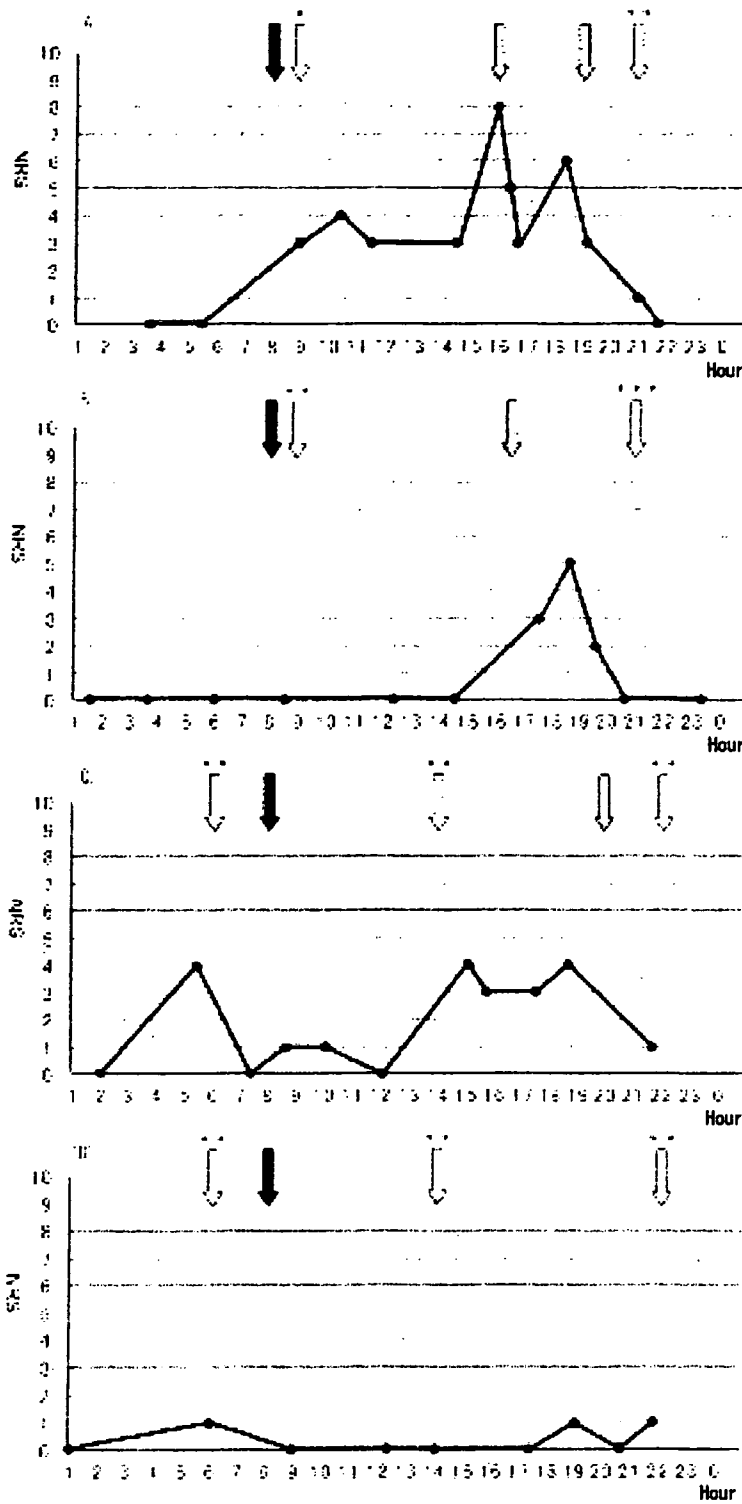


Figure 2. Transition of pain level using the "Itamikei" on the second day (A); sixth day (B); tenth day (C); and thirteenth day (D).
 white arrow: oxycodone *5mg, **10mg, ***15mg
 gray arrow: morphine 5mg
 black arrow: NSAIDs (meloxicam) 10mg
 NRS: Numeric Rating Scale.

effect in relation to myocardial infarction.⁹ This is in line with various findings in an animal model,¹⁰ yet our study does not show evidence of an association between CETP and CHD mortality in Caucasian men and women aged 55 and older. These findings combined suggest that the effect of the I405V CETP polymorphism may be relevant for CHD morbidity but that, by itself, its role is limited in terms of mortality. Further research aiming at the elucidation of the role of CETP in the metabolism of cholesterol and cellular functions will be pivotal for understanding CHD risk.

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ASSOCIATION BETWEEN FEEDING VIA PERCUTANEOUS ENDOSCOPIC GASTROSTOMY AND LOW LEVEL OF CAREGIVER BURDEN

To the Editor: Percutaneous endoscopic gastrostomy (PEG) has become the preferred method of providing enteral tube feeding to older people who have difficulty eating.¹ Although a number of studies have been conducted to evaluate the effects of long-term nutritional support via a PEG tube on the outcomes of the patients, including mortality and morbidity, the outcomes of PEG placement from a caregivers' perspective has received little attention. Over the years, research on family caregivers has consistently demonstrated that greater caregiver burden relates to poorer mental and physical health,^{2,3} but little attention has been paid to the effect that providing care to a family member with PEG placement has on caregivers. This study assessed the caregiver burden of patients who underwent PEG tube placement and compared it with that of those who feed via other nutritional routes.

The present study consisted of a cross-sectional analysis of the baseline data of a subgroup of participants in the Nagoya Longitudinal Study of Frail Elderly.^{4,5} The study population consisted of 1,196 caregivers (mean age \pm standard deviation 63.9 \pm 12.3, 75.7% female, 43.7% spouse, 33.2% adult child, 20.2% daughter-in-law, 3.0% other) and matched care recipients who were community-dwelling older people (aged 80.8 \pm 8.2, 63.4% female) and were provided various home care services under the long-term care insurance (LTCI) program. The data included clients' demographic characteristics, a rating for 10 activities of daily living (range 0–20, mean score 11.4 \pm 6.7), a rating for instrumental activities of daily living (IADLs, range 0–8, mean score 2.5 \pm 2.4), and the Charlson Comorbidity Index (mean score 2.1 \pm 1.6). Severity of dementia was evaluated according to the criteria provided by the public LTCI policy, which are classified into five levels (42.0% had at least some cognitive impairment).⁶ The routes of nutrition and types of diet were classified into five categories: oral intake (1, solid regular-texture diet; 2, modified-texture diet (a minced or pureed texture); 3, nasogastric tube feeding; 4, PEG tube feeding; and 5, oral intake with enteral nutrition). Data were also obtained from caregivers concerning their own personal demographic characteristics, and their subjective burden as assessed using the Japanese version of the Zarit Burden Interview (ZBI, mean score 28.8 \pm 17.0).⁷ One-way analysis of variance (ANOVA) and analysis of covariance (ANCOVA) were used to compare caregiver burden according to the groups of nutrition routes and types of diet. Covariates of ANCOVA included relationship to the care recipient, IADL score, and cognitive levels. ANOVA with a Bonferroni correction for multiple comparisons was used to determine the difference in ZBI scores between groups.

Table 1. Routes of Nutrition, Types of Diet, and Caregiver Burden Score

Route of Nutrition and Type of Diet	Unadjusted*	Adjusted [†]
	Mean ± Standard Error	
Oral intake		
Solid regular-texture diet (n = 885)	27.9 ± 0.6 [‡]	29.2 ± 0.6 [§]
Modified-texture diet (n = 239)	31.8 ± 1.1 [‡]	28.6 ± 1.1 [§]
Tube feeding		
Via nasogastric tubes (n = 13)	32.2 ± 4.4	25.6 ± 4.5
Via percutaneous gastrostomy (n = 44)	29.3 ± 2.6	21.0 ± 2.6 [§]
Oral diet with tube feeding (n = 15)	34.3 ± 3.7	30.1 ± 4.2

*One-way analysis of variance.

[†]Analysis of covariance: covariates include relationship to care recipient, instrumental activity of daily living (IADL) score, and cognitive levels, which were significantly associated with the Zarit Burden Interview score in a stepwise multiple linear regression analysis. Incorporated variables were caregiver's age, caregiver's sex, activity of daily living score, IADL score, relationship, cognitive levels, Charlson Comorbidity Index, frequency of day care service use, and number of family members.

[‡] $P < .05$, [§] $P < .01$.

Table 1 provides a comparison of ZBI scores between groups. In the crude model (ANOVA), there were significant differences in ZBI score between a solid regular-texture diet and a modified-texture diet ($P < .05$), but no differences were observed between the other groups. In the adjusted model (ANCOVA), of the five groups, the lowest ZBI score was observed in caregivers with PEG use, and there were significant differences in ZBI score between the PEG group and the oral intake groups (solid regular-texture diet, $P < .01$; modified-texture diet, $P < .01$).

The present study demonstrated that receiving enteral nutrients via PEG is associated with the lowest level of caregiver burden after adjusting for covariates and that a higher burden is observed for caregivers of participants who receive oral feedings. The participants in the present study were older people living in the community with functional disabilities. Therefore, even if they were receiving oral feedings, many caregivers seem to be engaged in feeding them. It is assumed that oral feeding for disabled elderly people is often difficult, time-consuming, and demanding for caregivers. It has been demonstrated that eating difficulties in older patients lead to a considerable burden for caregivers.⁸ PEG placement may reduce the time required for assisted feeding, although our results do not encourage PEG placement for elderly people only because of the association between PEG use and the low levels of caregiver burden. Even when caregiver time is limited, it is unacceptable to initiate tube feeding via PEG merely to facilitate care or reduce care burden. Efforts to enhance oral feeding by altering the environment and creating patient-centered approaches to feeding should be part of routine care for patients with difficulty eating. Nevertheless, the association between feeding via PEG and a low level of caregiver burden is another consideration in decision-making for long-term enteral feeding in older adults.

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UPTAKE OF INFLUENZA VACCINATION IN DUTCH NURSING HOME PERSONNEL FOLLOWING NATIONAL RECOMMENDATIONS

To the Editor: Because recent studies have demonstrated substantial benefits from routine influenza vaccination in healthcare personnel of long-term care institutions, the Dutch association of nursing home physicians (Nederlandse Vereniging van Verpleeghuis Artsen) issued a guideline on influenza vaccination in nursing homes in 2004.¹ The disrupting effect of influenza on nursing home care has been acknowledged, and vaccinating healthcare workers against influenza reduces the occurrence of influenza infections and associated productivity loss.²⁻⁴ Even more important, frail patients who may benefit less from immunization against influenza are indirectly protected by a reduction of influenza virus transmission.⁴⁻⁶ Before the guideline, vaccine uptake in Dutch personnel was 5% to 8%.¹ Considering the fact that influenza vaccination rates in recommended patient groups in the Netherlands are among the highest in the world, such an uptake is extremely low. It was therefore hypothesized that introducing a national guideline might result in substantial improvement.

PARTICIPANTS, METHODS, AND RESULTS

In October 2005, a self-administered questionnaire was sent to the staff of all Dutch nursing homes ($n = 335$). Participants reported on uptake of influenza vaccination in patients and personnel in the preceding season (2004-2005 season), whether the institution had a written policy on influenza vaccination for personnel, what the current offering policy was (active request, employee's initiative,

or none), and whether personnel were currently offered information on influenza vaccination.

In all, 149 of the 335 (45%) questionnaires were completed and returned. The average vaccination rate was 10.5% for personnel (95% confidence interval of the mean (CI) = 8.7-12.3%) and 90.5% in patients (95% CI = 88.3-92.8%). Only 67 (45%) homes had a written policy. In all, 107 (72%) homes actively requested their employees to be vaccinated. Of homes with a written policy ($n = 67$), 65 (97%) actively requested their employees to be vaccinated. Of homes in which there was no written policy ($n = 72$), influenza vaccination was not offered in 27 (37%) and in seven (10%) was offered only if an employee asked for vaccination. Having a written policy, actively requesting personnel to be vaccinated, and informing personnel about influenza vaccination resulted in significantly higher mean vaccination rates in personnel (Table 1).

DISCUSSION

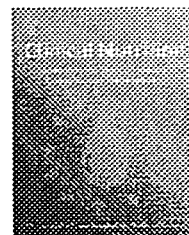
Compared with data from a similar questionnaire study from 2000,⁷ only a 5% absolute increase was observed in having a written policy (40% vs 45%), although in homes with a written policy, the proportion with an active request rose substantially, from 22% to 97%. Despite these organizational improvements, the uptake of influenza vaccination in personnel did not improve substantially (from 5-8% before to 11% in the year after the introduction of the guideline). The response rate of the previous questionnaire study was higher (73% vs 45%), but similar vaccination rates were found in patients (86% vs 90%). Also, the method used was similar, and bias is therefore highly unlikely. After all, awareness of a newly issued guideline should be most prominent in the first year. Even so, having a written policy, actively requesting personnel to get vaccinated, and informing personnel about influenza vaccination resulted in only slightly higher mean vaccination rates (12%). To implement the guideline successfully, more strategies are clearly needed. International research has shown a number of behavioral and organizational determinants to be of importance in raising vaccination levels among healthcare personnel in general, such as perceived influenza risk and severity, perceived vaccine effectiveness, and easy access to free vaccination.⁸⁻¹⁰ Further research is needed to assess which behavioral, organizational, and ethical determinants of vaccine uptake in Dutch nursing home personnel should be focused on when developing an effective influenza vaccination campaign.

Table 1. Effects of Policy Determinants on Mean Influenza Vaccination Rates in Nursing Home Personnel (N = 149)

Policy Determinant	Yes	No	P-Value [†]
	Number of Homes (%)		
Having a written policy	67 (12.4)	72 (7.8)	.01
Actively requesting personnel to get vaccinated	107 (12.1)	37 (5.3)	.002
Offering information to personnel in any way	111 (11.9)	22 (3.6)	.001

* Mean vaccination rate of nursing home personnel.

† Differences in mean vaccination rates were considered significant if $P < .05$.



ORIGINAL ARTICLE

Is serum albumin a good marker for malnutrition in the physically impaired elderly?

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Anthropometry;
Cholesterol;
Subjective global assessment

Summary

Background and Aims: Although serum albumin is well known as a marker of nutritional status, it has remained unclear whether impaired physical function affects serum albumin concentrations in older people. We examined whether hypoalbuminemia can be used as a marker of malnutrition in elderly subjects with various levels of physical impairment.

Methods: A total of 262 elderly subjects without acute illness were enrolled from various geriatric settings. For the nutritional assessment, serum albumin, total cholesterol, anthropometric measurements, and subjective global assessment (SGA) were determined. Physical function was evaluated by rating score of activity of daily living (ADL).

Results: As a whole, participants' serum albumin levels correlated with various nutritional parameters including anthropometric measurements and levels of serum total cholesterol as well as the SGA evaluation. However, after adjusting for age and gender, serum albumin levels in participants with a low ADL function did not correlate with nutritional parameters. Approximately 80% participants with low ADL function who were evaluated as being well nourished according to SGA evaluation had serum albumin levels lower than 35 g/l.

Conclusions: The utility of serum albumin and the traditional cutoff (35 g/l) in older people with low ADL function is questionable even among those without inflammation.

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Introduction

Malnutrition is a common finding in the elderly, not only in institutionalized populations but also in community-dwelling

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elderly, with prevalence rates ranging from 12% to 85%.^{1,2} Malnutrition is associated with increased hospitalization, increased susceptibility to infection, decreased wound healing, reduced quality-of-life, and increased mortality in the elderly.^{3,4}

Multidimensional screening tools such as subjective global assessment (SGA),⁵ and anthropometry measurements such as body mass index (BMI), mid-arm circumference (MAC), calf circumference (CC), and skin-fold thickness are generally considered the most easily obtainable, inexpensive, and noninvasive method by which to assess nutritional state. Biochemical measurements such as serum albumin and total cholesterol are also well known as markers for protein energy malnutrition (PEM).^{6,7} Among the biochemical parameters, serum albumin levels have long been considered a major measure of malnutrition. On the other hand, some reports have cautioned against using albumin as a measurement of nutritional status in hospitalized patients.⁸⁻¹⁰ The criticism is based on the fact that albumin is inversely correlated with markers of inflammatory activity and can behave as an acute-phase reactant, with markedly reduced levels in the setting of acute illness. In addition, it remains unknown whether impaired physical function affects serum albumin concentrations in older people. Thus, we still do not know whether hypoalbuminemia can be used as a marker of malnutrition for elderly people at various levels of activities of daily living (ADL) impairment, especially in the absence of inflammation or acute illness.

In the present study we examined whether hypoalbuminemia defined by a serum albumin level lower than 35 g/l can be used as a marker of malnutrition in elderly subjects without inflammation or acute illness. In addition we also examined whether physical impairment may affect the serum albumin concentration among well-nourished older people.

Subjects and methods

Subjects

We enrolled 262 consecutive elderly subjects (86 males and 176 females, mean age \pm SD: 81.8 ± 7.5 ; range: 65–95 years) from our geriatric outpatient clinic ($n = 69$), a nursing home ($n = 56$), and geriatric hospitals ($n = 72$). Among 262 participants 55 participants were receiving tube feeding and there were no participants receiving parenteral nutrition. The participants from geriatric hospitals were transfers from the acute care setting or from nursing homes for the care of chronic diseases or for the rehabilitation. The nutritional assessments were conducted at the admission. Informed consent for participation, according to procedures approved by the institutional review board of Nagoya University Graduate School of Medicine, was obtained verbally from the patients, or, for those with substantial cognitive impairment, from a surrogate (usually the closest relative or legal guardian) and from caregivers. Subjects diagnosed with infection, inflammation, liver disorders, kidney disorders, cancer at least within 2 months, or serum C-reactive protein ≥ 1.0 mg/dl were not included among the 262 participants to avoid the influence of inflammation on serum albumin levels.

Anthropometric measurements and biochemical markers

BMI is defined as weight in kg divided by height in meters squared. Triceps skin-fold (TSF) was measured with Harpenden calipers over the triceps muscle at the midway point between the acromion and the olecranon process. MAC and CC were measured on the left arm and calf with a tape measure. Arm muscle circumference ($AMC = MAC(\text{cm}) - \pi \times TSF(\text{mm})/10$) and arm muscle area (AMA) were calculated using the standard formula shown below: $AMA(\text{cm}^2) = (AMC(\text{cm}))^2/4\pi$. Three repeat measurements were taken to the nearest 0.5 mm, with the mean taken as the true value. All anthropometric measurements were taken at least twice by two different investigators; the reported values are the means of the repeated measurements. Blood samples were collected after an overnight fast. Serum albumin and total cholesterol levels were determined using automated analyzers.

Nutritional status using SGA was conducted by trained dietitians who were blinded to the levels of serum albumin, total cholesterol, and hemoglobin. SGA consists of a brief nutritional history (weight loss during the last 6 months; dietary change; and a short physical examination of subcutaneous fat, muscle mass, and fluid balance).⁵ SGA classifies patients as having PEM or moderate PEM or being well nourished; it focuses on medical issues and was constructed mostly from experience with surgical patients, but the use of SGA in older populations has also been validated.¹¹

Each site's nursing staff assessed each patient's functional status which included a rating for seven basic ADL (feeding, bathing, grooming, dressing, using the toilet, walking, and transferring) using summary scores ranging from 0 (total disability) to 20 (no disability).¹² Information obtained from medical records included physician-diagnosed chronic conditions comprising the Charlson comorbidity index,¹³ which represents the sum of a weighted index that takes into account the number and seriousness of preexisting comorbid conditions.

Definition of malnutrition

A BMI of less than 20 is widely accepted to indicate that the subject is underweight, particularly in well-developed countries, and 18.5 is recommended as a practical lower limit for most populations.¹⁴ Therefore, a diagnosis of malnutrition was made when BMI was less than 18.5 kg/m². Serum albumin and total cholesterol levels were used as the biochemical markers of undernutrition: levels lower than 35 g/l of albumin or 3.88 mmol/l (1.5 g/l) of total cholesterol were taken to indicate malnutrition.^{15,16}

Statistical analysis

The ADL score (range 0–20) was categorized into three groups with approximately equal number of participants in each group: high ADL function (ADL score ≥ 19), mid ADL function (ADL score 2–18), and low ADL function (ADL score < 2). Differences between ADL function groups were determined by analysis of variance with a Bonferroni

correction, the χ^2 test, or the Kruskal–Wallis test, as appropriate. Partial rank correlation coefficients adjusted for age and gender were used to measure the relationships between serum albumin levels and anthropometric measurements, biochemical markers, and SGA evaluation. To examine the relationships between ADL scores and serum albumin levels, partial-rank correlation coefficients were used after adjusting for age, gender, and AMC or SGA evaluation. The sensitivity and specificity of 35 g/l of serum albumin as a cutoff point for predicting malnutrition based on the various nutritional markers were also calculated. The significance level was set at 0.05. Data evaluation was carried out using the SPSS software package (SPSS Inc., Chicago, USA).

Results

The age, ADL score, Charlson comorbidity index, anthropometric measurements, serum biochemicals (albumin and total cholesterol), and SGA assessment for total participants and groups categorized by ADL score are shown in Table 1.

The group of low ADL function had the highest comorbidity condition, lowest anthropometric measurements, and lowest levels of serum albumin and total cholesterol compared with the mid or high ADL-function group. Of the low, mid, and high ADL-function groups, 28%, 57.4%, and 87.2% were evaluated as being well nourished according to the SGA classification, respectively.

Among all participants, serum albumin levels were well correlated with various nutritional parameters including anthropometric measurements and the levels of serum total cholesterol as well as SGA classification after adjusting for age and gender (Table 2). Among high and mid ADL-function groups there was also good correlation between serum albumin levels and all nutritional markers tested except for AMA and AMC in the high ADL-function group. However, in the low ADL-function group no correlation was observed between serum albumin level and any nutritional marker tested. Among total participants after adjusting for age, gender and ADL score, serum albumin levels were correlated with BMI ($r = 0.202$, $P = 0.002$), MAC ($r = 0.213$, $P = 0.001$), TSF ($r = 0.265$, $P < 0.0001$), CC ($r = 0.190$, $P = 0.003$), serum total cholesterol ($r = 0.275$, $P < 0.0001$), and SGA classification ($r = 0.288$, $P < 0.0001$) but not with

Table 1 ADL and nutritional characteristics

	Total, n = 262		Low ADL function, ADL score ≤ 1 , n = 82		Mid ADL function, ADL score = 2–18, n = 94		High ADL function, ADL score ≥ 19 , n = 86		P
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Men/women (% of male)	86/176	32.8	29/53	35.4	25/69	26.6	32/54	37.2	0.2666*
Age	81.8	7.5	83.6	8.6	82.5	7.3	79.4	5.7	0.0006
Activities of daily living (ADL, range: 0–20)	10.2	8.7	0.2	0.4	10.3	6.1	19.8	0.4	<0.0001
Charlson index	2.1	1.8	2.6	1.5	2.5	1.9	1.3	1.5	<0.0001
Body mass index (BMI, kg/m ²)	19.7	3.9	17.4	2.8	19.5	3.4	22.2	3.9	<0.0001
Midarm circumference (MAC, cm)	22.2	3.7	20.2	3.3	21.9	3.4	24.6	3.1	<0.0001
Triceps skinfold (TSF, mm)	9.8	5.9	7.2	3.8	8.1	4.1	14.5	6.7	<0.0001
Arm muscle circumference (AMC, cm)	19.1	2.8	17.9	2.7	19.4	2.8	20.0	2.5	<0.0001
Arm muscle area (AMA, cm ²)	29.7	8.6	26.1	7.8	30.6	8.7	32.3	8.1	<0.0001
Calf circumference (CC, cm)	27.0	5.2	22.2	3.3	27.4	3.8	31.7	3.5	<0.0001
Albumin (g/l)	36.0	5.7	31.1	4.0	35.6	4.7	41.0	3.3	<0.0001
Total cholesterol (Tch, mmol/l)	4.8	1.1	4.2	0.9	4.8	1.1	5.3	0.9	<0.0001
<i>Subjective global assessment (n, (% of total))</i>									
Well nourished	152	(58.0)	23	(28.0)	54	(57.4)	75	(87.2)	
Moderately malnourished	87	(33.2)	42	(51.2)	34	(36.2)	11	(12.8)	<0.0001**
Severely malnourished	23	(8.8)	17	(20.7)	6	(6.4)	0	(0.0)	

Age: high ADL vs. low ADL ($P = 0.0006$) or mid ADL ($P = 0.016$). Charlson index: high ADL vs. low ADL ($P < 0.0001$) or mid ADL ($P < 0.0001$).

BMI, MAC, CC: albumin: high ADL vs. low ADL ($P < 0.0001$) or mid ADL ($P < 0.0001$); mid ADL vs. low ADL ($P < 0.0001$).

TSF: high ADL vs. low ADL ($P < 0.0001$) or mid ADL ($P < 0.0001$).

AMC: high ADL vs. low ADL ($P < 0.0001$), mid ADL vs. low ADL ($P = 0.0012$).

AMA: high ADL vs. low ADL ($P < 0.0001$), mid ADL vs. low ADL ($P = 0.0013$).

Tch: high ADL vs. low ADL ($P < 0.0001$) or mid ADL ($P = 0.011$), mid ADL vs. low ADL ($P < 0.0001$).

SD: Standard deviation.

* χ^2 -test.

**Kruskal–Wallis test, others were determined by analysis of variance with a Bonferroni correction.

Table 2 Correlation between serum albumin and nutritional variables.

	Total, <i>n</i> = 262		Low ADL function, ADL score ≤ 1 , <i>n</i> = 82		Mid ADL function, ADL score = 2–18, <i>n</i> = 94		High ADL function, ADL score ≥ 19 , <i>n</i> = 86	
	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>	<i>r</i>	<i>P</i>
Body mass index	0.482	<0.0001	0.135	0.2370	0.367	0.0010	0.2391	0.039
Midarm circumference	0.485	<0.0001	0.176	0.1230	0.395	<0.0001	0.2511	0.030
Triceps skinfold	0.501	<0.0001	-0.022	0.8500	0.417	<0.0001	0.3978	<0.0001
Arm muscle circumference	0.297	<0.0001	0.205	0.0710	0.285	0.0090	-0.0335	0.775
Arm muscle area	0.281	<0.0001	0.195	0.0870	0.265	0.0160	-0.0384	0.744
Calf circumference	0.636	<0.0001	0.096	0.4010	0.457	<0.0001	0.2957	0.010
Total cholesterol	0.469	<0.0001	0.194	0.0890	0.394	<0.0001	0.2525	0.029
Subjective global assessment (SGA)	0.499	<0.0001	0.199	0.0810	0.258	0.0190	0.5488	<0.0001

ADL: activities of daily living. Data were adjusted for age and gender.

SGA rating: 0, well nourished; 1, moderately malnourished; 2, severely malnourished.

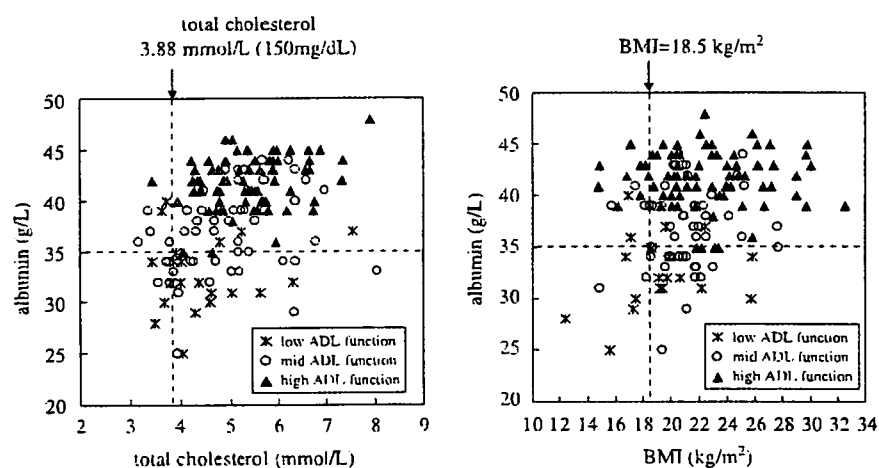


Figure 1 The relationship between levels of serum albumin and total cholesterol or BMI according to the three categories of ADL function among the well-nourished subjects as evaluated by SGA.

AMA ($r = 0.069$, $P = 0.285$) or AMC ($r = 0.086$, $P = 0.183$). Total ADL scores were well correlated with serum albumin concentration after adjusting for gender and age ($r = 0.726$, $P < 0.0001$). This correlation persisted after adjusting for SGA classification ($r = 0.650$, $P < 0.0001$) or AMC ($r = 0.699$, $P < 0.0001$), or both ($r = 0.644$, $P < 0.0001$).

Figure 1 shows the relationship between levels of serum albumin and total cholesterol or BMI according to the three categories of ADL function among the subjects evaluated as well nourished by SGA. There were no participants with albumin < 35 g/l among the well-nourished high ADL-function group with total cholesterol ≥ 3.88 mmol/l (150 mg/dl) or BMI ≥ 18.5 kg/m². However, 13 out of 16 participants (81.3%) of the well-nourished low ADL-function group, and 13 out of 44 participants (29.5%) of well-nourished mid ADL-function group had albumin < 35 g/l and total cholesterol ≥ 3.88 mmol/l (150 mg/dl). Furthermore, 12 out of 15 participants (80.0%) of the well-nourished low ADL-function group and 15 out of the 46

participants (32.6%) of the well-nourished mid ADL-function group had albumin < 35 g/l and BMI ≥ 18.5 kg/m².

In the low ADL-function group, 77.3% of the participants evaluated as being well-nourished according to SGA classification, 78.2% of the participants with serum total cholesterol concentration ≥ 3.88 mmol/l, and 82.1% of the participants with BMI ≥ 18.5 kg/m² had a serum albumin level < 35 g/l (Table 3). By contrast, among the high ADL-function group there were no participants with a serum albumin level < 35 g/l among those evaluated as being well nourished. Furthermore, only 3.6% of participants with total cholesterol levels ≥ 3.88 mmol/l and 2.9% of participants with BMI ≥ 18.5 kg/m² had serum albumin levels < 35 g/l. The sensitivity and specificity of 35 g/l serum albumin as a cutoff point of malnutrition based on the various nutritional markers are presented in Table 3. Among low ADL-function participants with nutritional status based on either SGA evaluation, total cholesterol levels (< 3.88 mmol/l), or BMI (< 18.5 kg/m²), the 35 g/l serum albumin cutoff point had

Table 3 Validity of cutoff point of serum albumin (<35 g/l) for malnutritional markers.

Nutritional markers		Serum albumin				P*	Specificity	Sensitivity
		<35 g/l		≥35 g/l				
		n	%	n	%			
Total								
SGA	Well nourished	34	22.8	115	77.2		0.772	
	Moderately malnourished	57	64.0	32	36.0	<0.0001		
	Severely malnourished	18	78.9	5	21.7			0.783
Tch	≥3.88 mmol/l	73	34.1	141	65.9	<0.0001	0.659	
	<3.88 mmol/l	35	77.8	10	22.2			0.778
BMI	≥18.5 kg/m ²	45	28.7	112	71.3	<0.0001	0.713	
	<18.5 kg/m ²	64	62.1	39	37.9			0.621
Low ADL function (ADL score: ≤1)								
SGA	Well nourished	17	77.3	5	22.7	0.421	0.227	
	Moderately malnourished	34	79.1	9	20.9			
	Severely malnourished	15	88.2	2	11.8			0.882
Tch	≥3.88 mmol/l	43	78.2	12	21.8	0.500	0.218	
	<3.88 mmol/l	22	84.6	4	15.4			0.880
BMI	≥18.5 kg/m ²	23	82.1	5	17.9	0.787	0.179	
	<18.5 kg/m ²	43	79.6	11	20.4			0.796
Mid ADL function (ADL score: 2-18)								
SGA	Well nourished	17	32.7	35	67.3	0.033	0.673	
	Moderately malnourished	20	57.1	15	42.9			
	Severely malnourished	3	50.0	3	50.0			0.500
tch	≥3.88 mmol/l	27	36.0	48	64.0	0.003	0.640	
	<3.88 mmol/l	13	76.5	4	23.5			0.765
BMI	≥18.5 kg/m ²	20	33.9	39	66.1	0.014	0.661	
	<18.5 kg/m ²	20	60.6	13	39.4			0.606
High ADL function (ADL score: ≥19)								
SGA	Well nourished	0	0.0	75	100.0	<0.0001	1.000	
	Moderately malnourished	3	27.3	8	72.7			
	Severely malnourished	0		0				
tch	≥3.88 mmol/l	3	3.6	81	96.4	0.947	0.964	
	<3.88 mmol/l	0	0.0	2	100.0			
BMI	≥18.5 kg/m ²	2	2.9	68	97.1	0.672	0.971	
	<18.5 kg/m ²	1	6.3	15	93.8			0.063

SGA: subjective global assessment, tch: total cholesterol, BMI: body mass index, ADL: activities of daily living.

* χ^2 test.

high sensitivity (0.882, 0.880, or 0.796, respectively) but low specificity (0.227, 0.218, or 0.179, respectively) as an indicator of malnutrition. Among low ADL-function participants with nutritional status based on SGA evaluation, the 3.88 mmol/l serum total cholesterol as a cutoff point had high specificity (0.727) but low sensitivity (0.500) as an indicator of malnutrition.

Discussion

In the present study we demonstrated that the serum albumin cutoff point of 35 g/l as an indicator malnutrition is not suitable for the elderly with low ADL function. In older people with low ADL function serum albumin levels were not

correlated with various nutritional parameters including anthropometric measurements, levels of serum total cholesterol, and SGA evaluation after adjusting for age and gender. Using a serum albumin level <35 g/l as a malnutrition indicator for the ADL-impaired elderly, about 80% of older people without malnutrition would be classified as malnourished (low specificity) while 11–20% of elderly persons with malnutrition would be missed (sensitivity). These results suggest that the use of a serum albumin level <35 g/l as a marker of malnutrition for elderly with low ADL function leads to over-diagnosis of malnutrition. It should be noted that we also observed that the use of a serum total cholesterol level <3.88 mmol/l as a marker of malnutrition would miss the half of the ADL-impaired elderly person with malnutrition.

The observation that serum albumin is a negative acute-phase protein suggests that serum albumin concentration could be a marker of inflammation. In fact, serum levels of albumin decrease in response to acute or chronic inflammation by altering the normal hepatic protein metabolism and inducing capillary leak.⁸⁻¹⁰ This concept is responsible for the reports that albumin is not a good marker for the nutritional status of the hospitalized elderly with illness.¹⁷ However, in this study we excluded patients having high C-reactive protein levels or acute illness within the past 2 months. It has been reported that serum albumin levels and SGA, two possible measurements of nutritional status in hospitalized older people, are often discordant.¹⁸ However, this previous interesting report did not address the interaction between serum albumin and the presence of inflammation or ADL status among hospitalized older people.

It has been reported that posture affects serum albumin levels; 1 h in the sitting position after resting in the supine posture during an overnight sleep increases serum albumin by 6.3%.¹⁹ Simply standing upright or sitting increases hydrostatic pressure, and this shift in balance between hydrostatic and oncotic pressures leads to a net movement of fluid from intravascular to interstitial spaces.²⁰ Most participants with low ADL function in the present study were hospitalized patients, and most of these were bed-ridden elderly. Blood specimens were drawn from low ADL-function participants lying in bed and from high ADL-function ambulatory participants in a sitting position. These postural differences may have affected the serum levels of albumin in both types of participants. However, it has been reported that there is an increase from the lying to the sitting position of about 6.5-7.7% in serum concentrations, not only of proteins but also of lipids including cholesterol.^{21,22} Therefore, the posture at the collection of blood samples may not explain our results.

We have demonstrated that ADL function is well correlated with serum albumin levels. One study has demonstrated that severe disability in ADL is strongly associated with anthropometric and biochemical parameters including serum albumin levels suggesting the presence of malnutrition.²³ However, this is not the case here, since the association between serum albumin and ADL status persists after adjusting for SGA classification, suggesting that this association is not mediated through nutritional status. It is possible that the correlation of serum albumin with ADL function may be mediated by muscle mass, since physical disability is well known to be related with muscle atrophy.²⁴ A cross-sectional study found an association between lower serum albumin concentration and lower muscle mass in the elderly.²⁵ It is known that several inflammatory cytokines down-regulate serum albumin concentration and increase muscle protein breakdown, which could potentially explain the association of low serum albumin with low muscle mass.^{8,26} One study has demonstrated that a low serum albumin concentration in older persons was associated with a greater loss of muscle mass during a 5-year follow-up even after adjusting for the effect of inflammation, although no association was detected between albumin levels and muscle mass at the baseline.²⁷ In the present study we demonstrated that albumin levels were well correlated with AMC or AMA, markers of muscle mass, among older people without acute illness and inflammation, indicating that inflammation is not involved in the correlation between serum albumin levels and muscle mass, at least in the present study. However, after

adjusting for ADL levels there was no correlation between serum albumin and the markers of muscle mass. In addition, the ADL score was well correlated with serum albumin levels after adjusting for muscle mass, suggesting that serum albumin levels might be associated with muscle mass through ADL function rather than with muscle mass directly among older people without acute illness or inflammation. Previous observation has demonstrated that physical exercise increases hepatic synthesis of albumin, resulting in the elevation of plasma albumin content.²⁸ It is possible that physical activity may be involved in the maintenance of serum albumin concentration through an increase in hepatic synthesis of albumin. Further studies will be required to determine the exact mechanism of the correlation of serum albumin concentration and ADL impairment in well-nourished older people. Since it has been reported that lower serum albumin is independently associated with weaker muscle strength,²⁹ further research is needed to clarify the exact interactions among serum albumin concentration, ADL status, and not only muscle mass but also muscle strength.

There are limitations in the present study. The distribution of ADL scores of our participants was not the normal distribution. Therefore, no line could be drawn separating the older people with poorer ADL function from those with better ADL function using <35 g/l of serum albumin as the cutoff point of malnutrition. A limitation included the relative small sample size in each categorized ADL subgroup which may affect the correlation between serum albumin and other nutritional parameters. Another potential limitation of this study was the reliance on self-reported past dietary change and past weight change which are included in SGA in subjects with potential for impaired cognition. We used only anthropometric measurements, AMC and AMC, for assessment of muscle mass; upper arm muscle mass might not reflect the full range of muscle mass.

In the present study we demonstrated that impaired physical function reduced serum albumin concentration even in well-nourished older people. The use of <35 g/l serum albumin as a marker of malnutrition for the elderly with low ADL function leads to over-diagnosis of malnutrition. Although the exact mechanism of the association between low albumin concentration and disability of ADL function remains unknown, lower muscle mass or decreased physical activity may be involved in this association. Therefore, when nutritional assessment is conducted for older people with impaired ADL function, special attention should be given to the interpretation of results of anthropometric measurements and serum albumin.

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Director perceptions of end-of-life care at geriatric health services facilities in Japan

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Geriatric health services facilities (GHSF) are expected to assume a greater role in caring for the dying elderly in the future. However, very little research has dealt with the topic. The aim of this nationwide study is to clarify current end-of-life care policies and practices of GHSF. The subjects were 2876 managing directors of GHSF. Data was collected through mailed questionnaires in 2003. The content of the questionnaires included: (i) general characteristics; (ii) end-of-life care policies; (iii) available medical treatments; and (iv) staff education. To evaluate the factors associated with end-of-life care policies at GHSF, we divided the facilities into two groups, according to whether their policy toward end-of-life care was progressive or regressive. The response rate was 40.3%. The results indicated that a total of 513 GHSF implemented progressive policies for end-of-life care. The factors associated with a progressive policy for end-of-life care were: (i) availability of medical intervention within and outside of the facilities; (ii) staff education; and (iii) discussion about end-of-life care policy with residents and family. Duration of stay also was positively associated with a progressive policy. Our study highlights the need for a national consensus on reforming the end-of-life care system of long-term care facilities.

Keywords: elderly, end-of-life care, geriatric intermediate care facility, long-term care facility, policy.

Introduction

In April 2000, Japan introduced a public long-term care insurance system to confront the challenges brought on by an aging society. Geriatric health services facilities (GHSF; i.e. geriatric intermediate care facilities) are public long-term care facilities, which include nursing homes, geriatric health service facilities and geriatric hospitals, covered by public insurance.¹ GHSF are facilities that provide nursing care and rehabilitation services aimed at enabling the elderly who do not need to be hospitalized to return home, thereby assuming an inter-

mediary position between nursing homes and geriatric hospitals (<http://www.roken.or.jp/english.htm>).

Due to the aging of the population, the preferences of elderly patients, and the rising health-care costs, a gradual shift in the place where elderly people spend their last years from hospitals to long-term care facilities is expected in the near future.²⁻⁷ As a result, it is anticipated that GHSF will assume a growing responsibility in caring for the dying elderly.⁸ Successful end-of-life care requires that the elderly and their families be guided in making decisions about the available treatment and about where to die.^{9,10} Because the range of medical expertise or resources presumed necessary for optimal care is limited at long-term care facilities,^{5,11} the elderly and their family should be well-informed about the various end-of-life care options available to them at the place where they want to spend the last days of their life.

However, so far, very little research has focused on end-of-life care at long-term care facilities for the elderly

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in Japan. Therefore, the aim of this study is to clarify and compare current end-of-life care policies and practices at GHSF in Japan.

Methods

Study sample

The subjects in this study were 2876 managing directors of GHSF belonging to the Japan Association of Geriatric Health Services Facilities as of November 2003.

Research content

Data was collected through mailed, self-reported, structured questionnaires covering: (i) general characteristics; (ii) end-of-life care policies; (iii) available medical treatments; and (iv) staff education. As for medical treatments, we chose 13 items that we estimated might be necessary in providing end-of-life care at GHSF.

In addition, GHSF that responded that they do not offer end-of-life care at their facilities were given the opportunity to explain their reasons in a structured questionnaire. Because relatively few studies have been carried out on end-of-life care at GHSF, we conducted interviews with several leading members of the Japan Association of Geriatric Health Services Facilities to define the possible barriers to end-of-life care provision at GHSF and draw up the questionnaire.

Data analysis

To evaluate the factors correlated with end-of-life care policies at GHSF, we divided the GHSF into two groups according to whether they had a progressive or a regressive policy toward end-of-life care. We then compared the characteristics of the two policy groups.

The data was analyzed using Statview-J5.0. Group differences were compared using the unpaired Student's *t*-test and the χ^2 test. *P*-values of <0.05 were considered to be significant.

Results

Of the 2876 subjects, 1160 (40.3%) responded. We excluded 26 GHSF that failed to provide data on their policies in responding to the questionnaire. The general characteristics of respondents are shown in Table 1. The average quota of the facilities was 91, and there was no significant difference between the groups. A greater number of facilities with a regressive policy towards end-of-life care were established after the year 2000. Two-thirds of the policy groups were found to be run by incorporated medical institutions, which are private not-for-profit organizations. There was no significant difference in the type of organization among the groups.

Moreover, no statistically significant results regarding the number of affiliated hospitals or clinics were found between the two groups. As for staff, the facilities with a progressive policy towards end-of-life care had more full- or part-time physicians than those with a regressive policy. No statistically significant results regarding the number of nurses or professional caregivers were found between the two groups. The average duration of stay was longer by over 100 days in facilities with a progressive policy than at those with a regressive policy. Facilities with a progressive policy were more likely to provide a private room. To cope with emergencies, facilities with a progressive policy had a full-time physician on 24-h call. Also, facilities with a progressive policy were more likely to secure a hospital which could send a physician in case of an emergency or a hospital to which their users could be admitted if necessary. These facilities were also more likely to secure a hospital which could send a physician in the impending death of a user. Facilities with a progressive policy were more likely to provide training and education concerning medical management and end-of-life care for nurses and/or professional caregivers. They were also more likely to routinely discuss their end-of-life care policy with the resident and family on admission.

The types of medical treatment available at GHSF are shown in Table 2. Except for treatment of bedsores, all listed treatments, namely i.v. drip injection, i.v. hyperalimentation, gastrostomy tube-feeding, nasogastric tube-feeding, oxygen inhalation, pain management, non-opioid drugs, opioids, sputum suction, indwelling urinary catheter, intermittent urinary catheterization and mechanical ventilation, were more likely to be available at facilities with a progressive policy. It should be noted that very few GHSF of either group confirmed that they offered i.v. hyperalimentation or mechanical ventilation.

We also asked the facilities with a regressive policy to explain the reasons for adopting such a policy. The reasons are shown in Table 3. The most frequent reason was medical staff shortage (52.7%), followed by organic barrier (40.4%) and restriction on medical intervention among nurses or caregivers (34.9%).

Discussion

Because the response rate was not satisfactorily high, partly due to GHSF with a regressive policy tending to refrain from responding, our results may be somewhat biased. In addition, because GHSF provide rehabilitation services in addition to nursing care, our research findings may not extend over to other types of long-term care facilities such as nursing homes.

However, the present study is a first step in analyzing the current situation of end-of-life care for elderly residents at long-term care facilities. This study

Table 1 Characteristics of geriatric health services facilities

Variables	Progressive group <i>n</i> = 513		Regressive group <i>n</i> = 621		<i>P</i> -value
	Average no.	SD %	Average no.	SD %	
Quota (average)	91.04	25.34	91.81	25.23	0.616
Establishment					
2000	61	11.89	106.00	17.07	0.007
Organization					
Government	26	5.07	40.00	6.44	0.454
Nonprofit organization					
Incorporated medical institution	355	69.20	402.00	64.73	
Incorporated social welfare institution	92	17.93	128.00	20.61	
Union	5	0.97	10.00	1.61	
Others	34	6.63	40.00	6.44	
Affiliated institution					
Hospital	203	39.57	232.00	37.36	0.330
Clinic	73	14.23	58.00	9.34	
Others	27	5.26	7.00	1.13	
None	213	41.52	295.00	47.50	
Staff occupation					
Physician	1.96	2.02	1.76	1.20	0.044
Nurse	11.64	5.73	11.56	3.75	0.804
Licensed care worker/helper	30.76	10.07	31.60	10.64	0.189
Duration of stay (day, average)	460.63	725.21	335.97	222.98	0.000
Private room	184	35.87	103.00	16.59	0.000
Physician's standby in case of emergency	430	83.82	439.00	70.69	0.000
Physician's visit from the outside available in case of emergency	271	52.83	236.00	38.00	0.000
Admission to hospital available in 24 h	476	92.79	554.00	89.21	0.025
Physician's visit from the outside available when the resident dies	278	54.19	127.00	20.45	0.000
Staff education medical treatment	489	95.32	551.00	88.73	0.000
End-of-life care	377	73.49	223.00	35.91	0.000
Having a discussion about end-of-life care policy with the resident and family on admission	459	89.47	253.00	40.74	0.000

demonstrates that current end-of-life care policies vary among geriatric health services facilities in Japan, and that the characteristics of GHSF differ according to policy.

Our results indicate that, after the year 2000, a greater number of facilities with a progressive policy were established than facilities with a regressive policy. This may be related to it taking much time to achieve a consensus before making a major policy decision to provide end-of-life care at GHSF. Facilities with a progressive policy had more full- or part-time physicians than those with a regressive policy, although both groups had less than two physicians (GHSF are required to arrange for at least one full-time physician in Japan). Also, facilities with a progressive policy were more likely to provide an on-call physician in case of emergencies. Unless facili-

ties have more than one physician, it is nearly impossible for them to maintain a 24-h emergency call system. These results suggest that physician shortage is a barrier to end-of-life provision at GHSF. A progressive policy towards end-of-life care provision was positively related to duration of stay. Our guess was that the facilities with a progressive policy had a shorter average duration of stay because they had more residents with worse clinical conditions than facilities with a regressive policy. As mentioned above, GHSF generally aim at enabling disabled elderly to return from acute care hospitals to home by providing nursing care and rehabilitation services. Therefore, it is possible that the GHSF with a regressive policy encouraged their residents to leave the GHSF without delay rather than to convalesce over long periods of time. Our results suggest that medical

Table 2 Medical treatments available at geriatric health services facilities

Variables	Progressive group <i>n</i> = 513		Regressive group <i>n</i> = 621		<i>P</i> -value
	No.	%	No.	%	
i.v. drip injection	482	93.96	557	89.69	0.013
i.v. hyperalimentation	53	10.33	23	3.70	0.000
Gastrostomy tube-feeding	456	88.89	484	77.94	0.000
Nasogastric tube-feeding	387	75.44	391	62.96	0.000
Oxygen inhalation	429	83.63	387	62.32	0.000
Dealing with pain	421	82.07	405	65.22	0.000
Non-opioid	448	87.33	482	77.62	0.000
Opioid	155	30.21	82	13.20	0.000
Dealing with bedsores	508	99.03	607	97.75	0.098
Sputum suction	506	98.64	588	94.69	0.002
Indwelling urinary catheter	498	97.08	568	91.47	0.000
Intermittent urinary catheterization	434	84.60	443	71.34	0.000
Mechanical ventilation	32	6.24	21	3.38	0.025

Table 3 Reasons for having regressive policy towards end-of-life care provision (*n* = 621)

Reasons	No.	%
Medical staff shortage	327	52.66
Structural barrier	251	40.42
Restriction on medical intervention among nurses or caregivers	217	34.94
Shortage of hospital or clinic involvement	136	21.90
Care staff shortage	132	21.26
Financial difficulty	92	14.81
Lack of understanding of the persons concerned	83	13.37
Others	115	18.52

assistance from the outside is more readily available at GHSF with a progressive policy. According to previous reports, when compared with hospitals, long-term care facilities have high rates of residents with untreated pain and greater limitations in medical resources such as infrequent physician presence.^{5,11,12} These factors may explain the high rates of medical assistance from the outside among GHSF with a progressive policy. However, it is difficult to determine from this study the reasons for building closer connections with outside medical assistance for end-of-life care at GHSF. Issues related to the profiles of GHSF, such as symptom management or other assistance received by dying GHSF residents, should be examined through additional research. We can also see a positive relationship between GHSF policies and staff education or discussion with residents or families on admission. Because

inadequate staff education and lack of a clear grasp of residents' or families' needs for end-of-life care are identified as limitations to quality end-of-life care,^{7,13} our results seem agreeable. Although staff education programs have rarely been studied at long-term care facilities such as GHSF in Japan, previous studies in other countries¹²⁻¹⁴ have called attention to the insufficiency of end-of-life care education for nursing home staff. We may also need to develop effective educational programs for non-medical professionals, such as GHSF staff, to promote essential knowledge and information regarding end-of-life care. However, we did not investigate the quality of staff education. Additional studies are needed to prove our hypothesis.

As for medical treatments, few GHSF reported that their facilities provide i.v. hyperalimentation or mechanical ventilation. Because palliative or comfort care is desirable for end-of-life residents, these life-sustaining interventions are not always required at end-of-life care settings. Therefore, our results seem logical. Also, opioids were available at only a few GHSF. Previous published work has suggested that elderly patients who suffer from dementia are more tolerant of pain,^{15,16} or that they are often unable to inform health-care providers about their pain due to a high prevalence of dementia or difficulty in communication.¹⁵⁻¹⁷ Because dementia is prevalent in long-term care facilities,¹¹ these are possible explanations for the lower frequency in opioid use at GHSF. However, previous published work has also indicated that pain is prevalent even in elderly residents at long-term care facilities.¹⁸⁻²⁰ It is possible that pain control is a major problem for dying elderly residents at GHSF regardless of whether or not they have cancer. Thus, nurses and/or caregivers should monitor and evaluate the pain of all patients on a daily basis.

In addition, the inside availability of the medical end-of-life care treatments we listed was significantly correlated to type of policy. In fact, we can presume that the greater number of physicians available at GHSFs with a progressive policy enables these facilities to provide a wider range of medical care options. We can also assume that the decision to provide end-of-life care prompted GHSF managers to implement procedures allowing for inside medical management. It is difficult to determine from this study precisely to what extent medical care support is needed for quality end-of-life care at GHSF. We need to perform a narrative study to gather further in-depth data.

Our results suggest that there were inconsistencies among the GHSF in terms of how they perceive their own capacity to provide end-of-life care at their facilities. GHSF with a regressive policy listed a number of official requirements for not providing end-of-life care, including shortage of personnel, living environment and treatment limitations of nurses or nursing assistants. The director perceptions presented in this paper suggest areas of focus for promoting end-of-life care in long-term care institutions. Although the extent to which a revision of the official requirements impact end-of-life care at GHSF is not yet determined, our results indicate that a national consensus on reforming the end-of-life care system at long-term care facilities is needed to provide better end-of-life care at GHSF.

Conclusions

We conducted the present study to clarify current end-of-life care policies and practices of GHSF in Japan, and related policy considerations. Our results suggest that there are inconsistencies among the GHSF in terms of how they perceive their own capacity to provide end-of-life care at their facilities. Also, GHSF were found to have distinct backgrounds and characteristics according to whether they held a progressive or a regressive policy, especially with respect to the availability of inside or outside medical end-of-life care. Additional studies and a national consensus on reforming the end-of-life care system of long-term care facilities such as GHSF are needed to improve end-of-life care for the elderly.

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〈原 著〉

療養型病床群 1 施設における心肺蘇生および急性期病院への 転院に関する家族の希望

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要 約 背景：高齢者施設での看取りが増加することが予想されており，入院・入所時に，心肺蘇生や急性期病院への転院・搬送など終末期状態に陥った際にどのような対応を希望するか高齢者および家族を交えて話し合っておくことは重要である。諸外国ではアドバンスディレクティブ Advance directives (AD) と呼ばれる終末期ケアに関する方針を記録する書式が普及しており，その中で心肺蘇生や病院への搬送を希望しないなどの指示などがある。しかし，わが国においては，終末期における自己決定のあり方に関する調査はほとんどない。そこで，心肺蘇生や急性期病院への搬送に関する自己決定が困難である患者の家族が表明する希望とそれに関連する因子を明らかにすることを目的として本調査を実施した。方法：対象は，平成 17 年 4 月から平成 18 年 9 月までに愛知県内の療養型病床群 1 施設に新規に入院した全患者 70 人である。この療養型病床群は，入院時に医師が患者・家族に AD の作成を支援している。調査内容は，患者の特徴，心肺蘇生と急性期病院への搬送・転院の希望の有無であった。心肺蘇生および急性期病院への搬送・転院の希望と関連する患者の特徴を明らかにするため，心肺蘇生の希望がある群 (CPR+群) とそうでない群 (CPR-群) とで，患者の特徴を比較検討した。また，急性期病院への搬送・転院の希望についても同様に比較検討した。成績：対象者のほとんどが重度の要介護状態であり，対象者全員の AD は家族によって作成されていた。心肺蘇生の希望を持っていた家族は全体の約 16% で，急性期病院への転院の希望を持っていた家族は全体の約 37% であった。いずれの希望においても，年齢，性別，世帯構成，既往歴，要介護度，栄養摂取法，意識障害の有無など対象者の特徴には両群間で有意差はみられなかったが，AD の作成を支援した医師の割合は両群間で有意に異なっていた。結論：医師による説明を標準化する必要性が示唆され，家族や医療者に終末期ケアに関する議論を行う際の指針や教育が必要であると考えられる。

Key words：心肺蘇生，高齢者，事前指定書，代理決定，施設

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緒 言

わが国は世界でも類をみない速さで高齢社会を迎えている。人は老いて死ぬことが避けられない以上，高齢社会の到来は高齢者の死の増加を意味する。一致した見解はないものの，がん患者の場合はおおよそ 6 カ月以内に死亡すると認められた時点から終末期といわれることが多い。一方，高齢者は老衰という避けられない自然経過をたどるうえ，心不全・脳梗塞後遺症など様々な慢性病を抱えていることが多く，高齢者の場合は終末期がいつから始まるのか判断することは難しい¹⁾。そのため，高齢者が長期にわたって入院・入所することが多い高齢者介護施設において，入院・入所時に，心肺蘇生や急性期病院への転院・搬送など終末期状態に陥った際にどのよ

うな対応を希望するか高齢者および家族を交えて話し合っておくことは重要である²⁾。諸外国では，終末期状態に陥ったときに希望するケアの選択肢を記したアドバンスディレクティブ Advance directives (AD) と呼ばれる書式があり，do-not resuscitate (DNR) directives と呼ばれる心肺蘇生を希望しないといった指示や do-not-hospitalize (DNH) directives と呼ばれる病院への搬送を希望しないといった指示などがある²⁾。それらにより，人々が終末期ケアに関する自己決定を行う際の一助となることが期待されている。

しかし，わが国と文化・社会的背景や思想が異なる米国の制度をそのままわが国に取り入れていくことは難しく，わが国の実情にあった終末期ケアに関する自己決定のあり方を考えていく必要がある。この分野の研究データの蓄積が急務であるが，わが国において先行調査は少なく，そのあり方に関する議論を行うための基礎資料はほとんどない。心肺蘇生や急性期病院への転院に関する高齢者および家族の希望とそれに関連する因子について調査することは，わが国における終末期ケアに関する自

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己決定のあり方を考える上で重要なステップである。そこで、入院時に必ず患者および家族と医師で一定の書式を用いて終末期ケアの方針について話し合うことにしている愛知県内の療養型病床群1施設を対象に、終末期の心肺蘇生と急性期病院への転院に関する高齢者・家族の希望および関連因子を明らかにするために本調査を実施した。尚、対象者全員が認知症などによりコミュニケーションが困難であったため、最終的には終末期ケアに関する家族の希望に関する調査となった。今回の調査結果は、医師や看護師ら終末期ケアに関わる専門職が患者やその家族らの意思決定を支援する上での重要な示唆を与えるものと考えられる。

方 法

対象は、平成17年4月から平成18年9月までに愛知県内の療養型病床群1施設に新規に入院した全患者70人である。この療養型病床群は、病床数101の全てが療養病床であり、一般病棟やリハビリテーション病棟はない。また、緩和医療の推進など特徴的な方針を唱えていない。また、外科的処置など高度な医療にも対応できる病院に隣接しており、医療連携は密で患者の交換がよく行われている。そして入院時には患者・家族にその旨を告知して、必要な場合には隣接病院への転院が比較的容易であることを伝えている。診療体制は主治医制ではなく、常勤・非常勤医によるグループ診療制度である。入院時に、医師より病院所定のADにしたがって全患者に終末期ケアに関する医療行為を説明し、希望を聞くことにしているが、この療養型病床群にはコミュニケーションに障害がある患者が入院することが多いため、その場合には家族に説明することになっている。説明にあたる医師は5人(表1)で、各患者に対して1人の医師が説明にあたった。ADには、心肺蘇生の希望、昇圧剤投与の希望、輸血実施の希望、中心静脈栄養など人工栄養の希望、治療・手術を受けるための急性期病院への搬送の希望、などが項目として含まれている。データ収集にあたり、事前指定書の項目のうち心肺蘇生と急性期病院への転院の希望について調査を行った。また、患者について、年齢・性別など属性、家族構成、疾患、意識障害、日常生活自立度などについても調査した。

本調査を開始するに当たり、不参加の場合でもなんら不利益を受けないことを通知して病院長および事務長に同意を得た。ADを含めた診療情報の収集は匿名化により行われた。さらに、それらのデータ解析結果の公表が個人・施設が特定されない形で行うことを条件に、入院時には口頭で、以後も公示により、調査・研究のために

表1 説明を担当した医師の特徴

医師	年齢(歳)	性別	専門	勤務
A	86	男	内科(一般)	常勤
B	72	女	内科(一般)	常勤
C	56	男	内科(老年科)	常勤
D	41	男	内科(老年科)	非常勤
E	34	男	内科(老年科)	非常勤

他施設がデータ使用を行うことについて全患者から予め承諾を得るなど個人のプライバシー保護については十分に配慮した。ただし、研究の趣旨をあらかじめ患者に知らせることで日常診療に影響を与えることを避けるため、データ収集は敢えて後ろ向きに行った。

解 析

心肺蘇生・急性期病院への搬送の希望と関連する患者の特徴を明らかにするため、対象患者の特徴を家族が心肺蘇生 cardiopulmonary resuscitate (CPR)の希望を持っている群(CPR+群)とそうでない群(CPR-群)と、また、家族が高度な治療を実施することを目的とした急性期病院への搬送の希望を持っている群(転院+群)とそうでない群(転院-群)とで比較検討した。CPR-群と転院-群とも、しない、わからない、医師に任せる、と希望していた患者を含めた。また、それらの希望が不明である場合には解析から除外した。統計解析には、StatView-J 5.0 (SAS Institute Inc, Cary, NC)を用いて、非連続量についてはカイ2乗検定、連続量については対応のないt検定を行った。P<0.05を統計学的に有意差があるものとした。

成 績

対象者の属性を表2に示す。対象者70人の平均年齢は約82歳で、男女比はおおよそ1:1であった。世帯構成では一人暮らしが最も多かった。入院時の主病名として、脳卒中が最も多く全体の3分の2を占めた。Body mass indexの値からは、やせ傾向がある患者が多いことが分かった。また、全体の5分の1が腹部の手術歴をもっていた。対象者のほとんどが要介護4以上であった。栄養摂取方法について、胃ろうチューブからの栄養投与が最も多く、経口摂取が次に続いた。治療の希望について、CPRを希望した家族は全体の約16%で、急性期病院への転院を希望した家族は全体の約37%であった。

患者の特徴や説明した医師と心肺蘇生の希望との関係を表3に、急性期病院への転院の希望との関係を表4に

表2 対象者の特徴 (N=70)

項目	カテゴリー	%もしくは平均 ± SD
年齢 (歳)		81.8 ± 10.3
性別 (女)		54.3
世帯構成	一人暮らし	31.4
	夫婦	24.3
	2世代	22.9
	3世代	10.0
	その他	8.6
身長 (cm)		153.0 ± 9.7
体重 (Kg)		40.5 ± 7.2
主疾患	脳卒中	67.1
	循環器疾患 (高血圧を除く)	24.3
	呼吸器疾患	20.0
	消化器疾患	11.4
	悪性腫瘍	7.1
	その他	67.1
褥瘡	あり	17.1
手術歴	胸部	4.3
	腹部	20.0
	その他	5.7
要介護度	1	0.0
	2	1.4
	3	5.7
	4	27.1
	5	62.9
栄養摂取法	経口	31.4
	経鼻	24.3
	胃瘻	42.9
意識障害		35.7
説明した医師	A	22.9
	B	20.0
	C	18.6
	D	8.6
	E	4.3
	その他	2.9
心肺蘇生の希望	あり	15.7
急性期病院への転院の希望	あり	37.1

示す。いずれの希望とも患者の特徴とは有意な関係はみられなかったが、ADの作成を支援した医師の割合は両群間で有意に異なっていた。心肺蘇生について、常勤医師Aの作成支援を受けた家族の間で希望が多く非常勤医師で老年科を専門とするDとEの支援を受けた患者の家族の間で希望が少なかった。また、急性期病院への転院について、Dの支援を受けた家族の間で転院を希望する者が少なかった。

考 察

わが国において、本調査のように実際の臨床現場で患者および家族の心肺蘇生もしくは急性期病院への転院の

希望の調査を試みた研究はほとんどない。しかし、結果的に、本調査の対象者全員が終末期ケアに関する話し合いを行うのに十分なコミュニケーション能力を有していないと判断されたため、家族など代理人の希望を調査することにした。ADは患者がケアの希望に関する自己決定を行う助けとなるものであるが³⁾、本調査の対象施設のような要介護度が高くてコミュニケーションが容易でない患者が多く入院している療養型病床群においては、ADの調査は難しいと思われ、調査方法の検討が今後必要であろう。ただし、わが国ではADは必ずしも普及しておらず⁴⁾、今回の調査のように終末期ケアに関する自己決定能力が低下した状況になって家族や医師が代わ