

Introduction

A byproduct of the ageing of the population has been a rise in bed-ridden patients who remain at home.^{1,2} However, it is currently difficult to adequately meet the demand for home rehabilitation services for the bed-ridden elderly staying at home due to a shortage of physical therapists and occupational therapists.^{1,3-6} Home massage rehabilitation therapy by trained professionals is available to the bed-ridden elderly as an alternative home rehabilitation service in Japan.

Massage has been used since ancient times both in the East and the West.^{7,8} Recently, the demand for massage therapy as a useful adjunct to medical treatment has been on the rise in the US.⁹⁻¹²

There is now a need for 'evidence-based alternative medicine' in addition to evidence-based medicine.^{7,10,13,14} Various countries, including the US, have encouraged research into the effects of alternative medicine.^{11,13,15} We believe it is important to perform further studies for a more reliable evaluation of the effect of alternative medicine in Japan. A number of papers have highlighted the positive effects of massage treatments.^{7,16-21}

However, to our knowledge, no study has reported on the effect of home massage rehabilitation therapy on the bed-ridden elderly. We therefore conducted a pilot study to evaluate the effect of home massage rehabilitation therapy on the following: activity of daily living (ADL), quality of life (QOL), apathetic mood and depressive mood of the bed-ridden elderly in communities.

Methods

Patient selection

Study participants were recruited for a period of nine months, from June 2002 to February 2003 from groups of users of home nursing stations, visit care stations and a day service centre in Aichi prefecture, Japan. We contacted service stations closest to our university and explained the study procedure to the director, chief administrator or head nurse. Staffs with one or more licences of nurse, physical therapist, occupational therapist or care manager were in charge of recruitment. The inclusion criteria were as follows: 65 years and above, cognitive impairment not likely to interfere

with adherence to the study, bed-ridden condition rank B or C; stable general condition and no rehabilitation therapy within three months of enrolment, and permission of the physician in charge. All eligible participants were required to agree to the study and sign informed consent forms.

The Japanese public nursing care system recently established the licence of care manager, whose primary responsibility is to oversee the co-ordination of care services for elderly people.

In Japan, the term 'bed-ridden' does not equate to being restricted to bed. Japan's Ministry of Welfare identifies four ranks of ADL of disabled elderly ranks B and C are defined as 'bed-ridden' condition in the criteria:

- Rank J = independent in ADL:
Despite certain limitations, person is mostly independent in daily life and goes out on his/her own.
 - 1) Goes out using any means of public transportation.
 - 2) Goes out around the neighbourhood.
- Rank A = house-bound:
In general, person can manage indoors independently, but requires some kind of care when going out.
 - 1) Goes out with assistance, and spends most of the day out of bed.
 - 2) Seldom goes out, and spends the day in and out of bed.
- Rank B = chair-bound:
Requires some care indoors and spends most of the day in bed, but can maintain a seating position.
 - 1) Transfers to a wheelchair on his/her own and goes out of bed for meals and excretion.
 - 2) Requires assistance in transferring to a wheelchair.
- Rank C = bed-bound:
Spends the whole day in bed, and requires assistance with excretion, eating meals and changing clothes.
 - 1) Turns over in bed on his/her own.
 - 2) Does not turn over in bed on his/her own.

Allocation

We alternatively allocated the participants to either a home massage rehabilitation group (HMG) or a routine care group (RCG) in order of enrolment. Participants were enrolled in their order of appearance on a list of eligible applicants provided by each station. We commissioned each station to send us the list when participants' recruitment completed.

Massage intervention

The HMG received 30-min sessions of home massage rehabilitation 2 or 3 days a week for 12 consecutive weeks. A local massage practitioner was assigned to each patient. Massage practitioners were selected by the professional Association of Licensed Massagers of Aichi prefecture. As a safety measure, the participants were given the option to stop receiving home massage rehabilitation therapy whenever they wished. Both HMG and RCG were also allowed to receive home rehabilitation and/or day care for the duration of the study.

The intervention of home massage rehabilitation consisted of medical massage and kinesitherapy as follows:

Medical massage

Medical massage included two kinds of massage: therapeutic massage and nursing massage.⁸ Both consisted predominantly of rub and finger-pressure techniques.

- *Therapeutic massage* aims at the direct treatment of illnesses in internal medicine, orthopedics, neurology and other fields.
- *Nursing massage* aims at the indirect treatment of illnesses. It prevents or improves the patient's weakness or fatigue.

Kinesitherapy

- Sitting balanced exercise
- Sitting up exercise
- Standing up exercise
- Gait exercise
- Range of motion (ROM) exercise.

Baseline and follow-up assessment

Assessments were performed at baseline and at three months. All participants were assessed by

qualified assessors having one or more licences of nurse, physical therapist, occupational therapist or care manager using the Barthel Index (BI),²² Subjective Satisfaction and Refreshment Scale,²³ Apathy Scale^{3,24} and Self-rating Depression Scale (SDS).²⁵ The Subjective Satisfaction and Refreshment Scale was assessed on a 4-item scale (3 = strongly, 2 = moderately, 1 = slightly, 0 = not at all) based on answers to the following question: 'To what extent do you feel satisfied and refreshed in daily life?' As for the apathy scale, we used the shortened edition of the apathy scale translated by Kobayashi. The scale consisted of 14 heads, and points were allotted to each question from 0 to 3. Higher scores reflect apathetic mood in this scale. The SDS was used to assess depressive mood.

The assessors were not blinded. They probably found out who was given intervention because they were staff from the participating stations usually providing home care for each participant.

Statistical analysis

We analysed the significance of intergroup outcome differences at baseline. Proportions were compared by the χ^2 test. Continuous data was compared using the Mann-Whitney test. We also analysed the significance of the differences between intergroup changes over time by analysis of variance (ANOVA) with repeated measures. *p*-values < 0.01 were considered significant. Statistical analyses were performed with the Statview J-5.0.

Results**Profile of trial**

We approached about 100 stations on participants' recruitment. Seventeen stations co-operated in the study. A total of 53 users were recruited for the trial, 26 in the HMG and 27 in the RCG. The subjects belonged to three home nursing stations, 13 visit care stations, and one day service centre in Aichi prefecture. At three months, the protocol was completed for 40 subjects, 22 in the HMG and 18 in the RCG. Four subjects were hospitalized, none in the HMG and four in the RCG. Nine subjects were lost to follow-up for personal or unknown reasons, four in the HMG and five in the RCG (Figure 1).

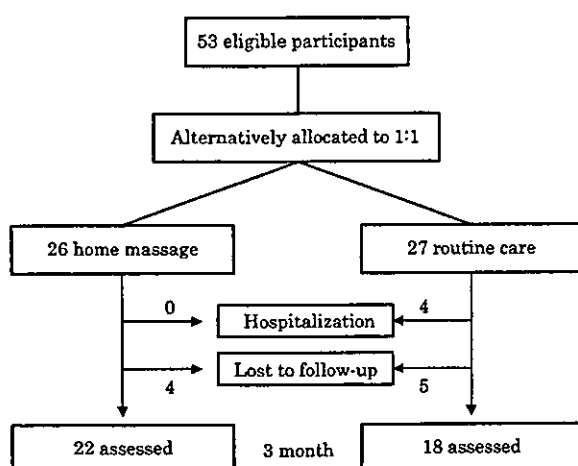


Figure 1 Flow diagram for the trial.

Baseline characteristics

The baseline characteristics of the HMG and the RCG subjects followed up three months after enrolment are summarized in Table 1. The baseline characteristics of the subjects in the HMG and the RCG were matched for age, presence of spouse living together, diseases associated with disabilities and use of day care rehabilitation ($p = 0.76, 0.36, 0.94$ and 0.71 , respectively). A stroke was the most frequent cause of disability in both groups ($n = 12$ and 12 , respectively). The HMG ($n = 14$) had a greater number of females than the RCG ($n = 6$) ($p = 0.06$).

Main outcome measures

Table 2 shows main outcome measurements of subjects at baseline. The total BI score of the HMG (15.27 ± 4.51) at baseline was nonsignificantly lower than that of the RCG (11.44 ± 6.0) ($p = 0.03$). In the Subjective Satisfaction and Refreshment Scale there was no significant difference between the baseline scores of the two groups (0.90 ± 0.85 and 1.35 ± 0.75 , respectively). In the Apathy Scale there was no significant difference between the baseline scores of the two groups (18 and 23, respectively). In the SDS, there was no significant difference between the baseline scores of the two groups (45 and 46.5, respectively).

Table 3 shows main outcome measurements of subjects at three months. In BI there were no significant differences between the intergroup changes over time in the total ($p = 0.35$) and each of 10 categories. In the Subjective Satisfaction and Refreshment Scale, Apathy Scale and SDS there were no differences between the intergroup changes over time between the two groups ($p = 0.08, 0.70$ and 0.55 , respectively).

Discussion

Outline and weaknesses of study

This study examined the effect of massage therapy, a traditional oriental medicine treatment, on at-home elderly in Japan. Despite extensive recruitment which lasted about nine months, the

Table 1 Baseline characteristics of subjects

Variable	HMG ($n = 22$)	RCG ($n = 18$)	p -value
Age (mean \pm SD) years	80.09 \pm 8.09	79.67 \pm 8.46	0.76
Female	14	6	0.06
Living with spouse	13	8	0.36
Family member (mean \pm SD)	1.8	2.4	0.12
Going to day care	5	5	0.71
Cause of independence in ADL			0.94
Stroke	12	12	
Cirulatory illness	2	2	
Respiratory illness	1	1	
Orthopaedic illness	6	3	
Rheumatism	1	1	

HMG, home massage rehabilitation group; RCG, routine care group.

Proportions were compared by the χ^2 test. Continuous data were compared using the Mann-Whitney test.

Table 2 Outcome measurements of subjects at baseline

Variable	HMG (n = 22)	RCG (n = 18)	p-value
BI (mean ± SD) (95% CI)			
Total (0–20)	15.27 ± 4.51 (13.27–17.27)	11.44 ± 5.90 (8.51–14.38)	0.03
Feeding (0–2)	1.77 ± 0.53 (1.54–2.01)	1.56 ± 0.71 (1.21–1.91)	0.40
Bathing (0–1)	0.46 ± 0.51 (0.23–0.68)	0.22 ± 0.43 (0.01–0.43)	0.21
Grooming (0–1)	0.73 ± 0.46 (0.53–0.93)	0.61 ± 0.50 (0.36–0.86)	0.53
Dressing (0–2)	1.50 ± 0.67 (1.20–1.80)	0.94 ± 0.73 (0.58–1.31)	0.03
Bowel (0–2)	1.64 ± 0.58 (1.38–1.89)	1.50 ± 0.86 (1.07–1.93)	0.92
Bladder (0–2)	1.41 ± 0.67 (1.11–1.70)	1.44 ± 0.78 (1.05–1.83)	0.73
Toilet use (0–2)	1.64 ± 0.58 (1.38–1.89)	1.06 ± 0.73 (0.69–1.42)	0.02
Transfers (0–3)	2.55 ± 0.67 (2.25–2.84)	2.00 ± 0.97 (1.52–2.48)	0.09
Mobility (0–3)	2.50 ± 0.80 (2.14–2.86)	1.50 ± 1.25 (0.88–2.12)	0.01
Stairs (0–2)	1.09 ± 0.68 (0.79–1.39)	0.72 ± 0.75 (0.35–1.10)	0.14
Subjective Satisfaction Scale (mean ± SD) (95% CI)	0.90 ± 0.85 (0.50–1.30)	1.35 ± 0.70 (0.99–1.71)	0.12
Apathy Scale (median) (95% CI)	18 (16–25)	23 (18–28.5)	0.32
SDS (median) (95% CI)	45 (42.5–49.5)	46.5 (38.5–50)	0.89

HMG, home massage rehabilitation group; RCG, routine care group.

There were no significant intergroup outcome differences at baseline (the Mann–Whitney test). *p*-values < 0.01 were considered significant.

sample size of the study was small for the following reasons: many users were already receiving home rehabilitation in the stations/centre, many users had dementia, and many users were reluctant to change to alternative allocation. The blindness was

limited because the station staff necessarily knew which group the participants were assigned to. We enlisted each station to perform the evaluation because of a shortage of staff and the large quantity of settings. This may have biased assess-

Table 3 Outcome measurements of subjects at three months

Variable	HMG (n = 22)	RCG (n = 18)	p vs. baseline
BI (mean ± SD) (95% CI)			
Total (0–20)	15.05 ± 4.87 (13.25–18.02)	10.89 ± 6.29 (7.76–14.01)	0.35
Feeding (0–2)	1.64 ± 0.58 (1.38–1.89)	1.44 ± 0.71 (1.09–1.79)	0.37
Bathing (0–1)	0.50 ± 0.51 (0.27–0.73)	0.17 ± 0.38 (0.01–0.43)	0.33
Grooming (0–1)	0.82 ± 0.50 (0.60–1.04)	0.61 ± 0.50 (0.36–0.86)	0.53
Dressing (0–2)	1.50 ± 0.80 (1.14–1.86)	0.89 ± 0.76 (0.51–1.27)	0.90
Bowel (0–2)	1.59 ± 0.67 (1.30–1.89)	1.28 ± 0.83 (0.87–1.69)	0.85
Bladder (0–2)	1.41 ± 0.73 (1.08–1.73)	1.22 ± 0.88 (0.79–1.66)	0.63
Toilet use (0–2)	1.73 ± 0.63 (1.45–2.01)	1.17 ± 0.79 (0.78–1.56)	0.94
Transfers (0–3)	2.59 ± 0.67 (2.30–2.89)	1.94 ± 0.87 (1.51–2.38)	0.75
Mobility (0–3)	2.36 ± 0.90 (1.96–2.76)	1.39 ± 1.15 (0.82–1.96)	0.27
Stairs (0–2)	1.32 ± 0.72 (1.00–1.64)	0.78 ± 0.73 (0.41–1.14)	0.42
Subjective Satisfaction Scale (mean ± SD) (95% CI)	1.00 ± 0.80 (0.63–1.37)	1.00 ± 0.61 (0.69–1.31)	0.08
Apathy Scale (median) (95% CI)	23 (18.5–27.5)	25.5 (20.5–31)	0.70
SDS (median) (95% CI)	49 (45.5–51)	49.5 (41.5–55.5)	0.55

HMG, home massage rehabilitation group; RCG, routine care group; CI, confidence interval.

In all variables, there were no significant differences between intergroup changes over time by analysis of variance (ANOVA) with repeated measures. *p*-values < 0.01 were considered significant.

sors' evaluation and limited the validity of the results. Bed-ridden people in our inclusive criteria are more prone to dementia.²⁶ This may explain the presence of a large number of demented elderly in the participating service stations. Because those suffering from dementia could not reply to the mental scale questions, we needed to exclude them from the object of this research. As for home rehabilitation, various stations justified users' refusal to participate in the study, alleging that many users already received home rehabilitation. This explanation, however, is in contradiction with the above mentioned reports.^{1,3,6} This may be because (1) rehabilitation resources by area are different and not lacking in Aichi prefecture,⁴ (2) the number of rehabilitation sessions per person may be small, and (3) nurses give home rehabilitations instead of physical therapists and occupational therapists.⁶

The baseline characteristics of the subjects in the HMG and the RCG were matched. This result supports the validity of the outcome measures in this study because the mental and physical state of the elderly is related to their social support.²⁷ However, we could not match the baseline outcome measurements between the two groups at the time of the allocation because this study did not accept enough participants to match the baseline outcome measurements at a time.

We should have excluded the provinces of rehabilitation, acupuncture and moxibustion from the study protocol to examine the effects of home massage accurately. In Japan, home massage programmes usually consist of medical massage and rehabilitation by a licenced massage practitioner. Some massage practitioners have a licence to practise acupuncture and moxibustion. According to some studies, home rehabilitation by physical therapists and/or occupational therapists may have an effect on ADL,^{28,29} while acupuncture and moxibustion may have an effect on ADL and depressive mood.^{30,31} As a result of a conference with the Massage Association, we concluded that rehabilitation could not be separated from home massage because rehabilitation, acupuncture and moxibustion are widely used in conjunction with massage in Japan.

Effectiveness

A few studies indicate a significant improvement in ADL by three-month rehabilitation in the chronic stage.^{28,32} To our knowledge, this is the first study investigating the effect of home massage rehabilitation therapy on ADL. We believe that this study is valuable in planning additional trials to assess the benefits of home massage rehabilitation therapy as an efficient substitute for hospital and/or home rehabilitation in the chronic stage.

However, the findings of the study may suggest that home massage rehabilitation therapy does not have a positive effect on the bed-ridden elderly in terms of ADL in the chronic stage. There are two possible reasons for this result: the first is that the three-month study period was too short to allow for the detection of significant differences. The second is that home massage rehabilitation alone may not trigger improvements in ADL. This result suggests that we need to appropriately combine home massage with other types of Western medical care services such as home nursing visits.^{31,33}

Geriatric rehabilitation aims at the improvement of QOL in addition to higher ADL.³⁴ Massage has documented mental benefits.^{7,8,16,35} However, we detected no changes in Subjective Satisfaction and Refreshment Scale scores, Apathy Scale scores and SDS in this study. These three scales may not match the study design because it is difficult to make an accurate assessment of QOL. We should also take it into consideration that more females were allocated to the HMG because there is a strong relation between depression and sex.^{27,36,37} Additional research is needed for a more accurate appraisal.

Table 4 Clinical course of all participants during six months

Group	Clinical course (illness)	<i>n</i>
HMG	Unknown	2
	Hospitalization	2
	Death (cerebral infarction)	1
RCG	Unknown	5
	Bad condition	2
	Hospitalizaion	6
	Death (cerebral infarction)	2

HMG, home massage rehabilitation therapy group; RCG, routine care group.

Clinical messages

- Recently, the demand for massage therapy as a useful adjunct to medical treatment has been on the rise.
- For the bed-ridden elderly, home massage rehabilitation therapy is feasible but has not been shown to be effective.
- Additional large-scale studies would be required to give scientific evidence.

Safety is an important consideration in the provision of alternative medicine.¹² In our study, none of the HMG and four of the RCG were hospitalized and therefore excluded from the research. Furthermore, six months after the start of our research, a follow-up survey of study participants was conducted. We did not detect any serious complications in HMG when comparing our findings at six months. The results of our follow-up survey are detailed in Table 4. However, we need additional research to prove the safety of home massage accurately.

Conclusion

We conducted a pilot study to investigate the effectiveness of home massage rehabilitation therapy. We concluded that this study did not suggest that home massage rehabilitation therapy was mentally and physically beneficial to the disabled at-home elderly. We need to conduct additional large-scale studies to give better evidence.

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Prevention of Late Complications by Half-Solid Enteral Nutrients in Percutaneous Endoscopic Gastrostomy Tube Feeding

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Key Words

Percutaneous endoscopic gastrostomy · Enteral nutrients, half-solid · Gastroesophageal reflux

Abstract

Background: Percutaneous endoscopic gastrostomy feeding is accompanied by unique complications, which are not easily controlled. **Objective:** In an attempt to decrease complications, we used half-solid nutrients for percutaneous endoscopic gastrostomy feeding in an 85-year-old woman. The patient had been receiving enteral nutrients via percutaneous endoscopic gastrostomy, and we examined whether this approach can reduce complications. She presented with regurgitation of enteral nutrients and recurrent respiratory infections. **Methods:** Half-solid enteral nutrients, prepared by mixing liquid enteral nutrients with agar powder, were administered via percutaneous endoscopic gastrostomy. **Results:** Symptoms of gastroesophageal reflux disappeared immediately after the start of half-solid enteral nutrient feeding. **Conclusion:** Gastroesophageal reflux and leakage, two intractable late complications of percutaneous endoscopic gastrostomy tube feeding, can be alleviated

by the solidification of enteral nutrients. Since this method allows quick administration of nutrients, it is also expected to help prevent the occurrence of decubitus ulcers and reduce the burden to the caregiver.

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Introduction

Feeding via a percutaneous endoscopic gastrostomy (PEG) tube is a safe and efficient method for patients who cannot maintain adequate oral intake. PEG feeding is accompanied, however, by unique complications which are not easily controlled. The administration of liquid nutrients is often accompanied by complications such as vomiting and diarrhea, although these complications may be minimized if the patient is sitting up during the administration or if the nutrients are administered at a slower rate. Nevertheless, these methods do not completely succeed in eliminating these common complications, and may require the patients and their caregivers to have great patience. In addition, maintaining the same position for many hours may worsen the conditions of patients who have pressure ulcers. Here we report a case in which, by

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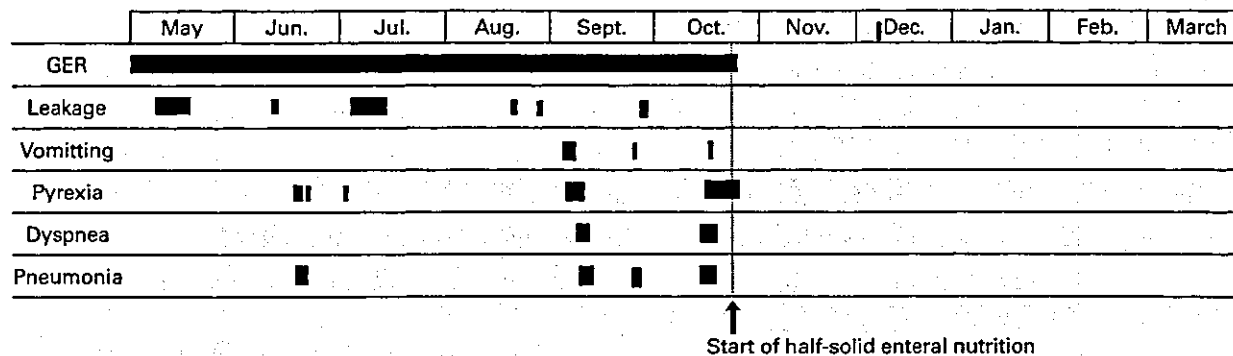


Fig. 1. Reduction of symptoms after half-solid enteral nutrition via PEG.

simply solidifying nutrients, the symptoms due to gastroesophageal reflux (GER) after PEG tube placement were relieved, and the leakage of nutrients from the PEG tube insertion site was alleviated.

Methods

An 85-year-old woman presented with regurgitation of enteral nutrients and recurrent respiratory infections after PEG placement. The patient suffered a cerebral infarction, and underwent PEG insertion on May 4, 2001, at a local hospital. After commencing PEG tube feeding, the following symptoms repeatedly occurred: regurgitation of the enteral feed; leakage of nutrients from the PEG tube insertion site; vomiting followed by pyrexia; dyspnea during the administration of nutrients, and pneumonia confirmed by chest X-ray. The patient often showed facial signs of discomfort during the feed administration. Liquid enteral nutrients were given in a sitting position at all times.

As the complications gradually became more frequent in occurrence, on October 21, 2001, we commenced giving her half-solid enteral nutrients which were prepared by mixing market-available enteral nutrients and agar powder. Half-solid nutrients were prepared by mixing 5 g agar powder with 500 ml liquid nutrients diluted with the same volume of water (1,000 ml total volume). The mixture was distributed into 50-ml syringes and kept in a refrigerator until it was administered via the PEG tubing. The mixture was not liquefied in the stomach due to body temperature. The administration of half-solid nutrients was made by injecting them into the stomach en bloc (injection time <5 min). The patient was not forced to remain in a sitting position during and after the administration.

Results

The symptoms, other than pyrexia, disappeared immediately after the administration of half-solid nutrients, and pyrexia vanished 2 weeks later. Also, the signs of discomfort during the feed administration were no longer noted. We followed the patient for up to 6 months after the start of the half-solid enteral nutrients, and observed no recurrence of the symptoms (fig. 1). At present (February 2004), the patient still remains in a stable condition and no longer suffers from the complications observed before the commencement of half-solid nutrients.

Discussion

PEG feeding is accompanied by unique complications, which occur over a long-term clinical course [1-3]. An increase in vomiting is one of the most common complications [4]. GER is clinically manifested by recurrent vomiting or aspiration. The mechanism by which GER increases in frequency has not yet been clarified.

Ogawa et al. [5, 6] suggested that since the stomach cannot move independent of the abdominal wall after the formation of a gastric fistula, enteral nutrients remain in the stomach longer, thereby increasing the chance of GER. Gastrin, a potent facilitator of peristaltic movement, may not be sufficiently induced by the distension of the stomach seen with slow infusion rates of liquid nutrients. Thus enhanced GER may eventually result. Since the nutrients can be administered in a short time by

our method (<5 min), the stomach wall is expected to be distended to a greater degree and thus stimulate peristaltic movement.

Another disadvantage of slow feed infusion is that patients are forced to remain in a sitting position for long periods while the nutrients are administered, which is unfavorable in terms of the prevention of decubitus ulcers, which are commonly found in patients with PEG feeding.

One of the late complications after PEG tube placement is leakage from the PEG tube insertion site. This is a difficult problem to cope with. There are two causes of leakage: inappropriate fixation of the bumper (including the so-called buried bumper syndrome [7]), and a decrease in the elasticity of the fistular opening, which develops over a long period after PEG placement [8]. The leakage resulting from a decrease in elasticity is intractable. Simply increasing the tube diameter cannot solve this

problem [7, 9]. We found, however, that solidification of the enteral nutrients alleviated the leakage in the present case. This may simply be explained by the fact that the solidified nutrients could not be leaked out by the intragastric pressure through the narrow gap between the fistular pore and the tube.

So far, we have administered half-solid nutrients to 17 patients with PEG feeding and followed up the patients for 6 months. During the observation period, we confirmed significant reductions in the complications observed before the commencement of the half-solid nutrients (data not shown).

In conclusion, our experience indicates that the use of half-solid nutrients in PEG feeding and their rapid administration can substantially reduce the risk of GER and may eventually contribute to a reduction in complications as well as an improvement in the quality of life of the patients and their caregivers.

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The Relationship Between Functional Disability and Depressive Mood in Japanese Older Adult Inpatients

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ABSTRACT

Depression is commonly found in older adult patients and is often associated with handicaps. The authors administered the Comprehensive Geriatric Assessment (CGA), including basic activities of daily living (BADL), instrumental activities of daily living (IADL), Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS)-15, and a socioenvironmental questionnaire to 198 patients who were admitted to Nagoya University Hospital, to examine the relationship between depressive mood and various physical and socioenvironmental outcomes. The overall GDS-15 score was correlated with the BADL and IADL. The factor analysis extracted 4 factors from the GDS-15 subscales. The factors labeled "loss of morale and hope" and "memory loss and reduction of social activity" were highly correlated with both ADLs, social variables, and the MMSE score. The results reveal that factor analysis of GDS-15 will help in understanding the etiology of depressive mood, thereby contributing to better therapeutic approaches. (*J Geriatr Psychiatry Neurol* 2004; 17:93-98)

Keywords: depressive mood; Geriatric Depression Scale; Comprehensive Geriatric Assessment; factor analysis

Depression is one of the most insidious problems faced by older adults, and its incidence is increasing with the growth of an aging population. Koenig and Blazer reported that the prevalence of major depression was about 1% among community-dwelling older adults and that less severe depressive disorder was present in over 25%.¹ Moreover, they reported that the rate of major depressive disorder in older adult hospitalized patients with illness was more than 10 times greater than that of the unhospitalized aging population. Depression is not only psychologically traumatic but also quite costly² because it is related to psychosomatic symptoms resulting in a higher frequency of examination and prescription of drugs. Fur-

thermore, depression also decreases the morale of older people and increases the risk of being housebound. Although it is very important to adequately diagnose and treat depression in its early stage, it often remains unrecognized or untreated.³ One of the main reasons for this is that depressive symptoms often resemble those of the aging process itself, such as progressive cognitive deterioration or physical disabilities.⁴

The Geriatric Depression Scale (GDS) is a self-administered questionnaire with 30 items⁵ and is recommended by the Royal College of Physicians and British Geriatrics Society as a valid screening method for depression in older adults.⁶ A short form of the GDS (GDS-15) was developed later⁷ and was translated into Japanese.⁸ The validity and reliability of the GDS-15 have been confirmed in both community and hospital settings.⁹⁻¹¹ Several studies have subjected the GDS-15 data to a factor analysis, which is a statistical technique to analyze interrelationships within a set of variables, resulting in the construction of a few hypothetical variables. To our knowledge, however, there has been only 1 study involving factor analysis of the Japanese version of the GDS-15, reported by Schreiner et al in poststroke patients.¹² In addition, there have been few studies demonstrating the relationship between GDS-15 factor loading and disabilities in the older population.

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The GDS-15 is included as one of the components in the Comprehensive Geriatric Assessment (CGA), a tool developed in the late 1980s^{13,14} to assess not only medical conditions but also overall functional status with respect to physical, psychological, and social problems of the older adults.

Although it is well known that depressive mood is often associated with functional disabilities, the mechanism by which the disabilities cause depressive mood in the older adults remains unclear. We hypothesized that some variables associated with functional disability may be associated with depressive mood. Therefore, we investigated the relationship between depressive mood and physical health and socioenvironmental variables in older adult inpatients. In addition, we attempted to clarify the structure of depression by performing a factor analysis of the GDS-15.

METHODS

Subjects

Among 355 consecutive patients aged 65 and older (mean age \pm SD: 77.3 \pm 6.8) who were admitted to Nagoya University Hospital between July 1998 and August 2001, patients who were admitted to nongeriatric wards were not included due to the absence of experienced CGA assessment team in the wards. Also, patients with communication impairments due to problems such as severe dementia or consciousness disturbance and patients under intensive care were not included in the study. If a patient was admitted more than once during the study period, only the data from the first admission was used for this analysis. As a result, 198 older adult patients in total were included in the study.

Measurements

The CGA was administered within a week after admission. The CGA included height; weight; Body Mass Index (BMI); blood pressure; basic activities of daily living (BADL), which were measured with the Barthel Index¹⁵; instrumental activities of daily living (IADL) using Lawton's scale¹⁶; Mini-Mental State Examination (MMSE)¹⁷; GDS-15; hearing ability and vision; communicative competence; and living environment including socioeconomic status. We scored IADL by 5 items (IADL-5), excluding food preparation, housekeeping, and laundry items from the Lawton's scale because the study samples included male patients, who did not normally perform these activities. The low scores of BADL and IADL-5 indicate greater functional disability. The GDS-15 is scored so that higher scores indicate a greater degree of depressive mood. The recent research clarified that the sensitivity of the GDS-15 was 97.3% and the specificity was 95.9% for screening major and minor depression when the cut-off score was set at 6/6+ in the Japanese geriatric population.¹⁸ Socioenvironmen-

tal status was assessed by Ozawa's scale,¹⁹ which includes items on economic, marital, family status, and the relationship between the patient and his or her family. The GDS-15 was self-administered by the patient. The attending nurse collected all other information by interview and/or assessment.

Statistical Analysis

Correlation coefficients were calculated by Pearson's method for parametric data and Spearman's for nonparametric data. We used the chi-square test with Yates correction and Fisher's exact test for categorical comparisons of the data. Differences in the means of continuous measurements between genders were tested using the Student's *t* test. In addition, after nonparametric data in the CGA were categorized into 2 groups (subjects with and those without a problem with respect to each parameter measured), the means of the continuous measurements between the groups were also compared by Student's *t* test. The internal consistency of the GDS-15 was calculated with Cronbach's alpha. Principal component analysis for the GDS-15 was performed with an eigenvalue of 1.0 or more as the extraction criterion, and factors were identified after Varimax rotation. The factor score, which shows the power of a factor's contribution, was calculated by regression method, which cumulated factor loadings of all items of GDS-15. In the present study, a higher score indicates a greater contribution of the factor to depressive mood. Differences in continuous variables among the disease groups were determined by 1-way analysis of variance (ANOVA). Tukey's test was used for multiple comparisons when homoskedasticity was assumed by Levene's method, and Dunnett's test was performed when homoskedasticity was not assumed. Multiple regression analysis, using the equation-building method with the variables of significant measures detected in the univariate analysis, was conducted to identify the variables contributing to GDS-15 scores. Values of $P < .05$ were considered to indicate statistical significance; all tests were 2-tailed. All statistical analyses were performed on a personal computer with the statistical package SPSS for Windows (Version 11.0 SPSS, Chicago).

RESULTS

Table 1 reports CGA variables for all patients, according to their diagnostic category. The mean GDS-15 score of all patients was 5.9 \pm 3.8 SD, and 39.3% of the patients had scores above 6. The homoskedasticities were assumed in age, systolic blood pressure, BADL, IADL-5, and GDS-15, but not in BMI or MMSE. Significant intergroup differences were observed on the BADL and IADL-5, but not in BMI, MMSE, or GDS-15. The BADL score in patients with diabetes mellitus was higher than that in patients with collagen disease ($P = .005$), and the IADL-5 score in patients with diabetes mellitus was higher than that in patients

Table 1. Mean Values ± Standard Deviation of Comprehensive Geriatric Assessment (CGA) Variables by Admitting Diagnosis

Admitting Diagnosis	n (%)	Age	BMI (kg/m ²)	sBP (mm Hg)	BADL	IADL-5	MMSE	GDS-15	GDS > 6
Neurological disease	40 (20%)	76.5 ± 6.6	20.9 ± 3.9	128.5 ± 23.7	16.9 ± 4.1	4.0 ± 1.3	24.9 ± 4.5	6.3 ± 3.7	42%
Cardiovascular disease	36 (18%)	77.7 ± 8.4	23.5 ± 3.8	132.8 ± 20.0	18.0 ± 3.7	4.0 ± 1.3	26.0 ± 4.3	5.7 ± 4.0	38%
Diabetes mellitus	34 (17%)	74.2 ± 5.3	23.5 ± 3.1	138.3 ± 19.4	19.0 ± 3.0*	4.5 ± 0.9*	26.6 ± 3.5	4.6 ± 3.5	27%
Psychological disease	20 (10%)	78.5 ± 6.5	20.0 ± 3.4	138.5 ± 22.3	17.9 ± 3.0*	3.1 ± 1.9*	22.4 ± 4.9	7.6 ± 3.8	15%
Gastroenterological disease	14 (7%)	78.9 ± 6.8	21.1 ± 4.8	132.3 ± 14.1	18.2 ± 3.2*	4.2 ± 0.9	25.9 ± 3.8	5.9 ± 4.7	64%
Collagen disease	12 (6%)	77.7 ± 5.1	21.6 ± 4.0	133.5 ± 20.6	14.2 ± 6.5*	3.3 ± 1.7	23.7 ± 4.7	5.4 ± 2.7	17%
Infectious disease	11 (6%)	83.1 ± 4.7	19.9 ± 3.0	122.0 ± 15.7	19.5 ± 0.8	4.8 ± 0.4	27.3 ± 2.8	2.8 ± 1.8	0%
Others	31 (16%)	78.0 ± 7.6	20.7 ± 3.5	142.4 ± 29.0	18.0 ± 3.9	4.3 ± 1.1	26.1 ± 4.1	6.3 ± 4.0	43%
Total	198 (100%)	77.3 ± 6.8	21.9 ± 3.8	133.9 ± 21.7	17.8 ± 3.8	4.1 ± 1.3	25.5 ± 4.3	5.9 ± 3.8	39%

Note: BMI = body mass index, sBP = systolic blood pressure, BADL = basic activities of daily living, IADL = instrumental activities of daily living, MMSE = Mini-Mental State Examination, GDS = Geriatric Depression Scale.

* $P < .05$.

Table 2. Principal Components (Varimax) Factor Analysis of the Geriatric Depression Scale-15

Items	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
1. Satisfied	0.708	0.270	0.061	-0.266
2. Dropped activities	0.058	0.646	0.350	-0.020
3. Emptiness	0.299	0.621	-0.134	0.179
4. Often bored	0.151	0.675	0.140	0.233
5. In good spirits	0.627	0.216	0.129	0.216
6. Afraid something bad will happen	0.336	0.572	0.163	-0.100
7. Feels happy	0.769	0.027	0.128	0.101
8. Often feels helpless	-0.186	0.536	0.493	0.013
9. Prefers to stay in	0.009	0.095	0.385	0.445
10. More problems with memory than most	0.082	0.074	0.043	0.305
11. Wonderful to be alive	0.553	0.077	0.458	0.033
12. Feels worthless	0.348	0.108	0.605	0.242
13. Full of energy	0.061	0.063	0.753	0.002
14. Feels situation is hopeless	0.270	0.235	0.679	0.090
15. Most people better off than self	0.487	0.396	0.013	0.368
Explained variance	2.4	2.2	2.2	1.2
Cumulative percentage of variance explained	16.6	31.5	46.3	54.8

Note: The factor score was calculated by regression method, which cumulated factor loadings of all items of GDS-15. Loadings in italic bold indicate those selected to define the factor.

with psychological disease ($P = .009$). The patients with psychological disease showed the highest mean score of GDS-15, (7.6 ± 3.8 SD). No significant intersex difference was observed in all parameters examined. Antidepressants had been administered to 7.2% of all patients, and to 9.0% of the patients with a GDS-15 score greater than 6.

The internal consistency of GDS-15 was found to be satisfactory, Cronbach's alpha being .83. Factor analysis of GDS-15 extracted 4 factors, whose loading values are shown in Table 2. The cumulative percentage of variance

Table 3. Correlation Between Geriatric Depression Scale-15, Extracted Factors, and Parametric Data

Measure	GDS-15	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
Age	0.123	-0.001	-0.108	0.250**	0.166*
BMI	-0.141	0.006	-0.135	-0.121	-0.036
sBP	-0.038	-0.260	-0.040	-0.009	-0.101
BADL	-0.168*	-0.033	-0.044	-0.191*	-0.055
IADL-5	-0.201**	-0.076	0.023	-0.235**	-0.066
MMSE	-0.151*	-0.034	0.050	-0.167*	-0.214**

Note: Pearson's rho used for correlations. BMI = body mass index, sBP = systolic blood pressure, BADL = basic activities of daily living, IADL = instrumental activities of daily living, MMSE = Mini-Mental State Examination.

* $P < .05$. ** $P < .01$.

explained was 57.3%. Factor 1 represented "unhappiness," which included the items satisfied, in good spirits, feels happy, wonderful to be alive, and most people better off than self. Factor 2, "apathy and anxiety," was made up of the items, dropped activities, emptiness, often bored, afraid something bad will happen, and often feels helpless. Factor 3, "loss of hope and morale," included the items feels worthless, full of energy, and feels situation is hopeless. Finally, factor 4, "memory loss and reduction of social activity," included the items prefers to stay in and more problems with memory than most.

Pearson's coefficients of continuous variables are shown in Table 3. The total GDS-15 score had a significant negative correlation with IADL-5 ($r = -.201, P = .005$), BADL ($r = -.168, P = .021$), and MMSE ($r = -.151, P = .034$). However, there was no significant relationship between the GDS-15 score and age, BMI, or systolic blood pressure.

The score of factor 3 (loss of hope and morale) correlated positively with age and negatively with IADL-5, BADL, and MMSE scores, whereas factor 4 (memory loss and reduction of social activity) showed a significant positive correlation with age and a significant negative correlation with MMSE score. However, there was no significant relationship between the scores of factor 1

Table 4. Relationship of Nonparametric Data in Comprehensive Geriatric Assessment With the Geriatric Depression Scale-15 and Extracted Factors

Measurement	Percent With Problem	Spearman's ρ With GDS-15	t Test for Mean Score GDS-15	Factor 1 Unhappiness	Factor 2 Apathy and Anxiety	Factor 3 Loss of Hope and Morale	Factor 4 Memory Loss and Reduction of Social Activity
Gender (male/female)	—	—	NS	NS	NS	-0.22/0.17**	NS
BADL (with/without problem)							
Grooming	7.1%	—	NS	NS	NS	0.75/-0.08**	NS
Feeding	8.1%	-0.087	NS	NS	NS	NS	NS
Bowel continence	12.2%	-0.062	NS	NS	NS	NS	NS
Using toilet	14.2%	-0.122	NS	NS	NS	NS	NS
Ambulation	16.8%	-0.102	NS	NS	NS	0.31/-0.09*	NS
Chair/bed transfer	16.8%	-0.142	7.1/5.6*	NS	NS	NS	NS
Dressing	17.8%	-0.122	NS	NS	NS	NS	NS
Bladder control	19.8%	-0.097	NS	NS	NS	NS	NS
Bathing	25.0%	—	6.9/5.5*	NS	NS	0.27/-0.12*	NS
Using staircase	29.9%	-0.271*	7.4/5.2**	NS	NS	0.33/-0.17**	NS
IADL (with/without problem)							
Going outside	10.4%	—	NS	NS	-0.41/0.10*	NS	NS
Using telephone	11.4%	—	NS	NS	NS	NS	NS
Managing money	20.3%	—	NS	NS	NS	NS	NS
Medication	37.1%	—	NS	NS	-0.14/0.15*	NS	NS
Shopping	39.4%	—	NS	NS	NS	0.21/-0.15*	NS
Physical (with/without problem)							
Seeing	23.1%	-0.141	NS	NS	NS	NS	NS
Hearing	23.0%	-0.091	NS	NS	NS	NS	NS
Communication	7.0%	-0.152*	8.2/5.7*	NS	NS	NS	0.51/-0.48*
Social							
Economic status (dependent/independent)	—	-0.163*	NS	NS	NS	NS	NS
Marital status (with/without spouse)	—	-0.148*	NS	NS	NS	0.20/-0.21**	NS
Familial status (alone/not alone)	—	-0.136	7.2/5.6*	0.50/-0.08*	NS	NS	NS
Family relation (with/without interaction)	—	-0.220*	NS	NS	NS	0.71/-0.03*	NS

Note: NS = not significant. t-test for mean score compared between 2 groups with or without problem for each item.

* $P < .05$. ** $P < .01$. Dashes indicate not calculated because the items have less than 3 alternatives

(unhappiness) or factor 2 (apathy and anxiety) and other CGA variables.

The patients were divided into 2 groups depending on their score for CGA variables. Then we compared the difference between the GDS-15 factor scores and these 2 groups using Student's *t* test. The correlations of nonparametric data with the score of GDS-15 and the extracted factors are shown in Table 4. The GDS-15 score had a significant negative correlation with BADL (using staircase), communicative ability, economic and marital status, and family relationship. Patients having problems in using the staircase, bathing, chair/bed transfer, and communication showed a significantly higher GDS-15 score than the patients without these problems ($P < .001$, $P = .041$, $P = .034$, $P = .028$, respectively). Also, patients living alone showed a significantly higher GDS-15 score than those not living alone ($P = .043$). The statistical analysis revealed that the score of factor 3 (loss of hope and morale) was significantly higher among women ($P = .007$). Factor 3 had a much stronger relationship with some variables of BADL and IADL-5, such as grooming, using staircase, ambulation, bathing, and shopping, than it did with other factors. On the other hand, factor 2 (apathy and anxiety) was

inversely correlated with going outside and managing medication.

Multiple regression analysis was performed to predict the score of GDS-15 with significant variables, which were using stairs, bathing, communicative ability, economic status, marital status, familial status, and the total score of MMSE. This analysis elicited a model with an adjusted R^2 of .144 ($P < .001$) (Table 5).

DISCUSSION

The mean GDS-15 score in this study was 5.9, which was higher than those in previous studies. In a recent study of 1343 Japanese community-dwelling older adults, the mean GDS-15 score was 2.0 and 23.7% scored 6 or higher.²⁰ Meanwhile, Patrick et al reported that the mean score of hospitalized patients in their geriatric rehabilitation unit was 3.8 ± 2.8 SD.²¹ The higher GDS-15 scores obtained in this study may imply that worsening medical conditions resulting in admission to the hospital relate to increased depressive symptoms. In particular, the neurological disease group showed the highest mean GDS-15 score, which is in line with findings in previous studies that depression

Table 5. Coefficients of Regression Model for Geriatric Depression Scale-15

Variable	β	Standardized	T	P Value
		β		
Using stairs	-2.48	-0.48	-4.27	< .001
Bathing	2.59	0.29	2.44	< .001
Communicative ability	-0.57	-0.04	-0.558	.016
Economic status	-0.48	-0.07	-0.917	.577
Marital status	-0.34	-0.09	-1.25	.360
Familial status	-1.02	-0.17	-2.17	.211
MMSE	-0.04	-0.04	-0.55	.584

Note: MMSE = Mini-Mental State Examination. GDS-15 = $-2.48 \times (\text{Using stairs}) + 2.59 \times (\text{Bathing}) - 0.57 \times (\text{Communication}) - 0.48 \times (\text{Economic status}) - 0.34 \times (\text{Marital status}) - 1.02 \times (\text{Family status}) - 0.04 \times \text{MMSE}$. Total adjusted $R^2 = 0.144$, $P < .001$.

frequently occurs after stroke.^{10,22,23} In the present study, antidepressants were administered to only 9.0% of the patients who had a GDS-15 score of greater than 6, which supports claims that depression is overlooked by clinicians, or is not treated adequately.⁴

The results of this study are consistent with previous findings that physical disabilities relate to depressive symptoms.²⁴⁻²⁷ In the present study, the GDS-15 score was negatively correlated with the BADL and IADL. Three BADL items in particular, using staircase, chair/bed transfer, and bathing, had strong negative correlations with the GDS-15 score. These results indicate that loss of lower body strength and impaired mobility may affect patient's mood. A possible explanation for the difference is that depressive mood may be associated with impaired abilities to maintain normality in life such as immobility, rather than the severity of disabilities.

We also found a weak but significantly negative correlation between the GDS-15 and MMSE scores. The findings of previous studies regarding the relationship between depression and the severity of dementia are varying, which may be attributable to differences in study design.²⁸ Although many investigators have reported a decrease in the frequency of depression in advanced dementia,^{29,30} no such association was found in this study probably because the cognitive impairment of the patients in this study was rather mild with mean MMSE score of 25.5 ± 4.3 SD, and no patients with advanced dementia were included.

Liu et al reported that being female, older, and without spouse were related to depressive symptoms among Chinese older adults.³¹ Our results did not demonstrate a significant relationship between the GDS-15 score and either gender or age, but a higher GDS-15 score was significantly related with economic dependence, absence of spouse, and poor family relationship particularly with "living alone."

Thus far, many researchers have reported on the factor analysis of GDS-15, but the relationship between the factors extracted and the physical, psychological, and socioenvironmental status of the older adults has not been extensively investigated. We found that factor 3, "loss of

morale and hope," was highly related with BADL and IADL. Meanwhile, factor 4, "memory loss and reduction of social activity," was related with age and MMSE, although factor 1 (unhappiness) and factor 2 (apathy and anxiety) were not correlated with any of those parameters examined, which means they may be normal aspects of disabled state and hospitalization. Some investigators have reported that sense of loss or environmental change can induce depression in the aged.^{32,33}

GDS-15 is often included in CGA, which is a useful tool to comprehensively assess older adult patients. The meta-analysis conducted by Stuck et al demonstrated that CGA was effective in improving mortality and in reducing hospitalization.³⁴ However, there have been few studies using CGA results to identify specific clinical strategies for patient care. The present study demonstrates that factor analysis of GDS-15 helps health care staffs establish better therapeutic strategies for depressive mood of older patients. For example, the present findings suggest that intervention to assist in coping with the functional impairment may decrease depressive symptoms in subjects suffering from them. However, pharmacological interventions may be more appropriate for nondisabled patients.

In conclusion, we carried out a structural analysis of the GDS-15 in older adult inpatients and extracted 4 factors related with functional disabilities. Factor 3, "loss of morale and hope," and factor 4, "memory loss and reduction of social activity," were highly related with ADL, social variables, and cognitive impairment. In addition, the results suggest that factor analysis will allow improved assessment and medical support of older adult inpatients. Thus, we believe that the results have indicated an extended utility of the GDS-15 not only as a simple screening method for depressive mood but also as a tool for better therapeutic approaches.

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高齢者医療の現場における低栄養ならびに栄養管理の認知度の調査

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はじめに

脆弱な高齢者では頻りに栄養不良が認められ、予後に大きく影響していることが明らかにされている¹⁻³⁾。特に長期療養型病床や老人保健施設などの介護施設入所高齢者では30%から40%近くが栄養不良状態と報告されている⁴⁾。近年急性期一般病棟での栄養管理の重要性は認識され、多くの病院で nutritional support team (NST) が立ち上がり、実績を積みつつある。今後日本では益々高齢化が進み、病床の半分を担うことが想定されている療養型病床ならびに介護施設での栄養管理推進が望まれるところである。しかし、今のところそれらの病床における栄養管理の実態については多くが不明のままである。今回我々は愛知県下の長期療養型病床群へのアンケート調査を行い長期療養型病床における栄養管理の実態を調査した。

I. 方法

愛知県医療法人協会の強力の下、194の法人理事長あてにアンケートの依頼を行った。このうち療養型病床をもつ施設は計93法人であり、アンケートは46法人より回収された。

アンケート内容は以下の通りである。

1. 療養病床数, 2. 経管栄養患者の受け入れ状況, 3. 入院患者の食事摂取および栄養の状況, 4. 入院患者の食事摂取の自立, ならびに介助の必要状況, 5. 経管栄養ならびに点滴を受けている患者数, 6. 経管栄養, 中心静脈栄養の施行場所, 7. 栄養不良患者数, 8. 栄養士数, 9. 入院患者身体計測(身長・体重)頻度, 10. 栄養アセスメント評価の有無, 11. 食事(経管栄養)カロリー数, 12. 認知機能障害者数, 13. 栄養療法の事前指示。アンケート内容の集計は46施設中の%で表し、小数点以下は四捨五入して表示した。

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II. 成績

アンケートの回答のあった施設の長期療養型病床数は平均 69.8 ± 75.0 (平均 \pm 標準偏差) であり、病床合計の内訳は介護保険型が24%, 医療保険型が76%であった。またアンケートに回答いただいた職種は看護師が50%, 医師が22%, 事務職が20%, ソシヤル・ワーカーが4%であった。

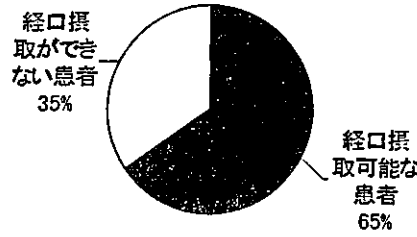
経管栄養を受けている患者の受け入れ状況は、経鼻経管は1施設を除きすべて受け入れ可能との回答であった。また胃瘻経管の受け入れ状況は受け入れないとした施設は7%であった。入院中の患者で経口摂取可能な患者の割合は各施設を平均すると65%が経口摂取可能な患者で、35%が経口摂取できない患者であった(図1)。経口摂取が自立している患者が全患者の50%以上いる施設は50%存在したが、逆に経口摂取自立者が10%に満たない病院が24%存在していた(図1)。また食事全介助者の割合は10%未満の病院が全体の39%ともっと多かったが、50%以上の患者が全介助である病院も10%存在していた(図1)。

経管・経静脈栄養を受けている患者は施設によりばらつきがあるが、平均すると経鼻経管、胃瘻経管とも10~13%程度存在していた(図2)。一方中心静脈栄養を受けている患者の割合は1%にも満たなかった。またそれらの栄養療法を自院で開始した率は経鼻経管が44%, 胃瘻経管が35%, 中心静脈栄養が64%, 末梢静脈栄養が95%であった(図2)。

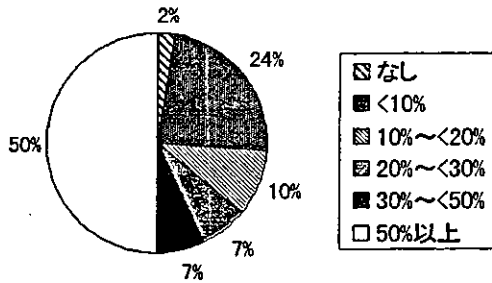
入院患者の内、栄養不良と思われる患者は「いない」と回答した施設が存在したが、10%未満と回答した施設が36%ともっとも多かったが、50%以上の入院患者は栄養不良であると回答した施設が5%存在していた(図3)。一方血清アルブミン値が 3.5 g/dl 未満の割合は施設ごとに相違があるが、19%の施設が約3割から5割の患者が 3.5 g/dl 未満であると回答した。また27%の病院では血清アルブミンの測定がなされていなかった(図3)。

身体計測の測定頻度に関しては、身長は入院時のみの

経口摂取可能・不可能な割合



経口摂取自立患者の割合



経口摂取全介助患者の割合

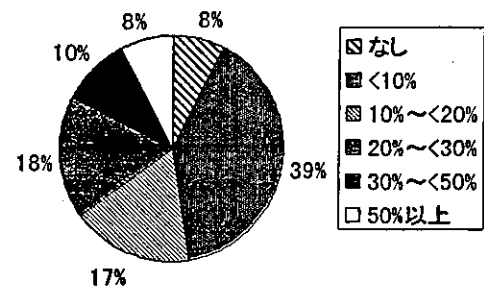
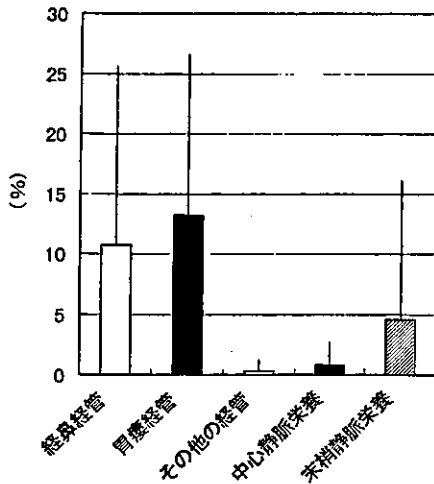


図1 経口摂取可能・不可能患者の割合ならびに経口摂取自立者・全介助患者の割合。

A



B

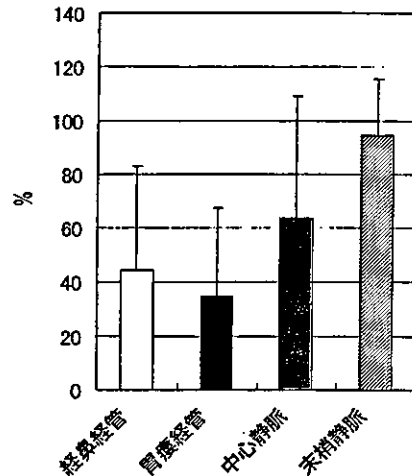


図2 療養型病床における経管栄養，静脈栄養。

A: 経管栄養，静脈栄養に依存している患者の割合。B: 経管栄養，静脈栄養療法を自院で開始した割合。グラフは全て平均値±標準偏差で表す。

測定が58%と最も多かったが、40%が必要時以外測定しないと回答した(図4)。体重測定に関しては多くの施設(44%)が1ヶ月に一度測定していたが、必要以外測定せずが19%、入院時のみが23%であった。栄養アセスメントの実施率は入院時のみ行っているのが23%、定期的に行っている病院が15%存在したが、半分以上の施設(62%)ではアセスメント自体が行われていなかった。

経口摂取可能な患者への一日の食事によるカロリーは平均すると1460.9±213.3 kcalであった。しかし、経管栄養を使用した投与カロリーは施設によりさまざま、ほぼ3/4(75%)の施設で全て一定のカロリーを投与していた。その時の平均投与カロリーは1012.5±164.2 kcalであった。経管を介する投与カロリーは施設によりさまざまであったが、1000 kcal未滿しか投与していな

高齢者医療の現場における低栄養ならびに栄養管理の認知度の調査

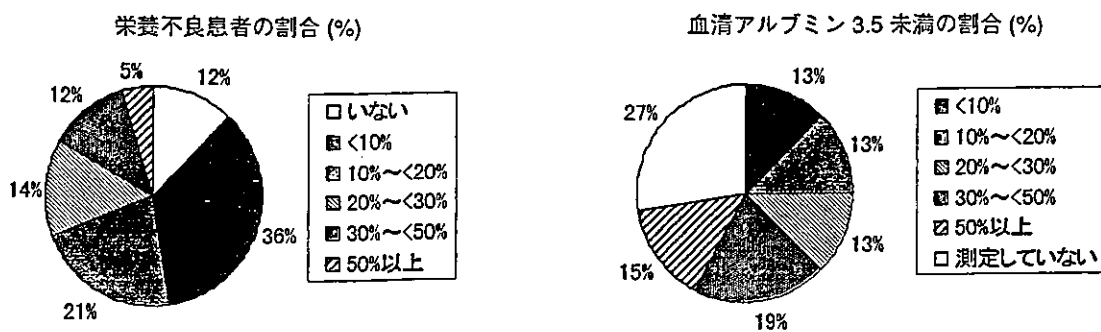


図3 栄養不良患者ならびに低アルブミン患者の割合。

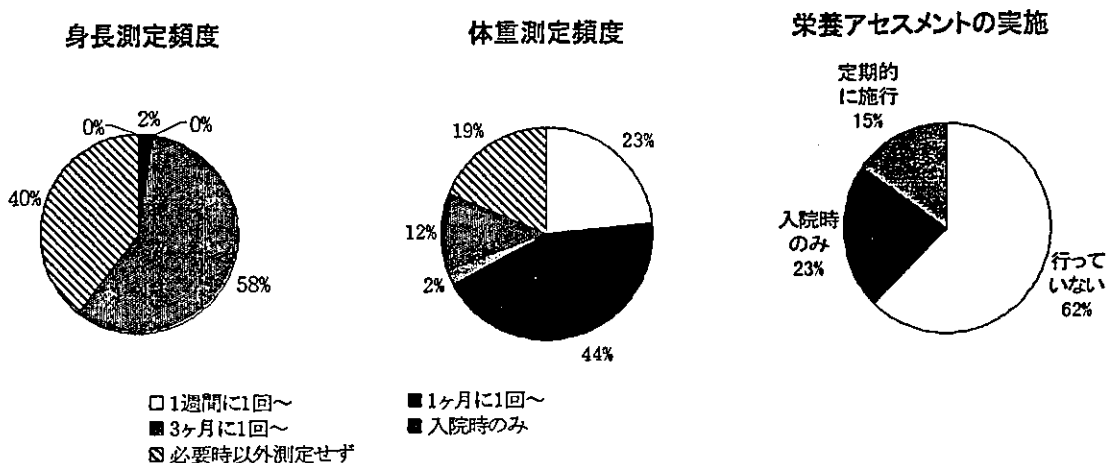


図4 療養型病床における身体測定、栄養アセスメントの頻度。

いという施設が 18%存在した。「将来経口摂取不能となった時の栄養療法のあり方に関して本人または家族に事前に希望をきいているか?」の質問に対して 62%の施設であらかじめ希望を聞いているとの回答であった。

III. 考 察

今回の調査では少なくとも愛知県では今やほとんどの長期療養型施設では経管栄養を施行されている患者の入院制限はないことが明らかになった。しかし、入院患者のうち経口摂取障害がある者の割合は高率であり、しかも自立して経口摂取ができるものの割合は驚くほど少なく、その多くは何らかの介助が必要である。それにもかかわらず、栄養アセスメントは半分以上の施設で行われていない。身長計測はともかくとして、体重測定が定期的に行われている施設が少ないのみならず、入院中必要時以外測定していない施設が少なくない。また、栄養指標の簡便なマーカーである血清アルブミンを測定していない施設も 1/4 存在していた。測定している施設の protein energy malnutrition の指標である血清アルブミン 3.5 g/dl 未満の患者の割合も驚くほど高い。実際、低アルブ

ミン血症、栄養不良と思われる患者は驚くほど多い。

杉山らは全国 8 地域 15 病院に入院中の高齢患者(女性 722 人; 平均年齢 81.8 歳, 男性 326 人; 平均年齢 80.0 歳)の女性患者の 39.4%, 男性患者の 42.8%が血清アルブミン値が 3.5 g/dl 以下であったとし、病院高齢入院患者の 30~50%の割合で低アルブミン血症が存在するとしている⁴⁾。また日常生活動作の低下している高齢者ほど血清アルブミン 3.5 g/dl 以下の者の割合が高いとしている。本調査は日常生活動作などの調査を施行していないため、詳細は不明だが、療養型に入院している患者ということもあり、ほとんどが日常生活動作のなんらかの障害を抱えている高齢者が対象になっているものと思われる。

経口摂取可能な患者への食事カロリーは 1600 kcal 前後と十分と思われる食事が提供されているが、一方、経管栄養を受けている患者には 1000 kcal 以下と回答した病院が 18%存在し、またどの患者にも一律のカロリー数を出している病院が多く、その平均投与カロリーは 1012 kcal であった。経口摂取患者に比較し、経管栄養患者のカロリーはかなり低く設定されている。おそら

く、経管栄養に依存している患者は寝たきり状態が多く、消費カロリーも低いことを想定してのことだと思われる。しかし、患者ごとの体格もことなり、代謝性ストレスを受けている患者も存在すると想像され、投与カロリーは栄養アセスメントをして投与カロリーを決め、しかも定期的なモニタリングによる微調整が必要である。しかし、上記のごとくアセスメントを行っている病院は少なく、モニタリングも実施されているか危惧するところである。

今回の調査では療養型病床スタッフへのアンケート調査に過ぎず、今後直接患者の身体計測、血液データの採取などを含む実態調査が必要と思われる。

しかしながら、今回の限られた調査でも明らかなのは療養型病床におけるスタッフの栄養に関する意識は決して高いとはいえず、引き続き障害をもつ脆弱な高齢者に対する栄養アセスメントの重要性などに関する啓蒙活動が必至であると思われる。昨今、急性期一般病院ではNSTが浸透しつつあり、患者の予後、QOL、医療経済的な側面で貢献している。今後はますます需要が増えることが予測される長期療養型病床でのNSTの実施が必要な時期にきている。

ま と め

愛知県医療法人協会所属の医療法人をアンケート調査

を行い、長期療養型病床における栄養管理の実態を調査した。経口摂取の自立していない患者ならびに経管栄養に依存している入院患者が著しく多く、低栄養患者も高率に存在することが明らかになった。しかしながら、栄養管理に必須と思われる栄養アセスメント実施率はきわめて低く、今後療養病床における栄養療法ならびにアセスメントに関する啓蒙が必要と思われる。

謝辞 本アンケート調査にご協力いただいた愛知県医療法人協会、ならびに愛知県医療法人協会会長下郷宏先生に深謝いたします。

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Malnutrition of the Elderly: Unrecognized Problem in Geriatric Medical care Facilities in Japan

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Although it has been well known that malnutrition is an important predictor of morbidity and mortality in the elderly and that malnutrition is a frequent and serious problem in geriatric patients, it is not fully known how often malnutrition was observed in the elderly in geriatric medical care facilities in Japan. We examine the state of nutritional care for the Japanese elderly at geriatric medical care facilities belong to Association of Aichi Healthcare Corporations by sending questionnaires to the facilities. The results from the 46 facilities showed the high prevalence rate of patients who cannot take in ad-

equated nutrition and are receiving tube feeding. Although the high prevalence rate of malnutrition was recognized in the facilities, the medical staffs do not sufficiently beware of their nutritional problem. Many elderly patients receive less than optimal nutritional care while hospitalized. The adequacy of the nutritional care routinely provided to elderly at geriatric medical care facilities is an important issue.

Key words: malnutrition, elderly, geriatric medical care facilities, nutritional care