

in some medium such as recording forms, the type of medium was entered in the column 'To what' and/or 'From what'. Entries in the 'From/To whom' column indicate the involvement of some person categorized as family, user, staff or others. Entries in the 'From/To what' column indicate the involvement of some recording medium categorized as forms, notes, voicemail or others. Forms are any recording medium of paper such as medical records. Notes represent Notes[®], a groupware of Lotus. Groupware is any type of software designed for groups and for communication, combining various software for supporting collaboration among a group of people with functions such as email, document management and schedule management.

2.2.5. Communication tools/media

The communication tools/media used in communication/recording tasks were categorized as follows: message, face-to-face conversation, voicemail, Notes, Wiseman Barcode, Wiseman Keyboard, extension call, outside line call, facsimile, medical record entries, references to other forms, and others.

Wiseman Barcode[®] and Wiseman Keyboard[®] represent the utilization of the nursing information management system of Wiseman[®], making use of barcodes and keyboards, respectively, for data entry. Wiseman Barcode[®] barcodes date, treatment, person-in-charge of treatment, and vital signs, and then reads them via a reader device. Wiseman Keyboard[®] utilizes a keyboard for data input.

2.2.6. Content

The content of communication/recording was categorized as follows: instruction (prescription), information, report, consultation, record, confirmation and others. Information means an unofficial communication which does not require reporting or recording.

2.3. Analysis

The changes between the two sessions of research were analyzed in terms of number of users, number of occurrences of communication/recording tasks, and category of service in use in relation to communication/recording tasks that occurred. To eliminate the influence on the number of communication/recording tasks induced by the change in total number of users, the data of the same users (153) was analyzed in both sessions.

Further, for these 153 users, a detailed analysis was conducted for a period of time where a significant change in the number of occurrences of tasks was found.

Data analysis was performed by Statview 5.0. For testing statically significant differences, the chi-square test was utilized with $P < 0.05$ as criteria.

3. Results

3.1. Total number of users and number of occurrences of communication/recording tasks

Table 1 shows the total number of users and the number of occurrences of communication/recording tasks. The total number of users was 400 in February and 442 in the August

Table 1
Number of occurrences of communication/recording tasks

	February	August	<i>P</i>
Overall			
Total number of users	400	442	
Occurrences of tasks	2811	4235	<0.001
153 subjects			
Total number of users	232	249	
Occurrences of tasks	1883	2244	0.300

Note: A chi square test was conducted between February and August sessions on the total number of users divided by the number of occurrences of the task.

session and the number of occurrences of communication tasks was 2811 and 4235, respectively. The increase in the number of occurrences of communication tasks was statistically greater than the increase in the number of total users ($P < 0.001$).

In the analysis of the 153 users whose data was obtained in both sessions, no statistical difference was found in the total number of utilized services, nor in the increase in the number of occurrences of tasks in comparison with the increase in the number of times at which they utilized these services.

3.2. Category of services

Table 2 shows the type of utilized in-home nursing service in relation to a particular communication/recording task. In both sessions, more than 80% of all utilized services belonged to one of the three most popular categories, i.e., daycare at clinic, daycare at GICF and short-stay at GICF. In August, both daycare at clinic and daycare at GICF were more often used ($P = 0.002$, <0.001) while short-stay at center was less often used ($P < 0.001$) than in February (Table 3).

Table 2
Number of occurrences of in-home nursing service by category

Service category	February (<i>N</i> = 1883)	August (<i>N</i> = 2244)	<i>P</i>
Daycare at clinic	340	493	0.002
Daycare at GICF	781	1071	<0.001
Short-stay at GICF	558	390	<0.001
In-home helper	102	107	0.381
Visiting care	86	95	0.656
Visiting rehabilitation	8	11	0.938
Home visit	2	2	0.999
Others	2	7	0.282
Unknown	4	68	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

Table 3
Number of occurrences of in-home nursing service by place

Place	February (<i>N</i> = 1883)	August (<i>N</i> = 2244)	<i>P</i>
Clinic	302	464	<0.001
GICF	1263	1434	0.036
At home	143	67	<0.001
Others	172	192	0.550
Unknown	3	87	<0.001

Note: A chi square test was conducted between February and August sessions. GICF: geriatric intermediate care facility.

3.3. Time of occurrence

Fig. 2 indicates the time of occurrence of communication/recording tasks. Peaks were found in the 8:00–12:00 and 14:00–18:00 periods. Also, the number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 periods.

3.4. Detailed analysis of 8:00–9:00 and 10:00–11:00 time periods

Regarding the communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 time periods, when an increase in tasks was observed, was further analysis was

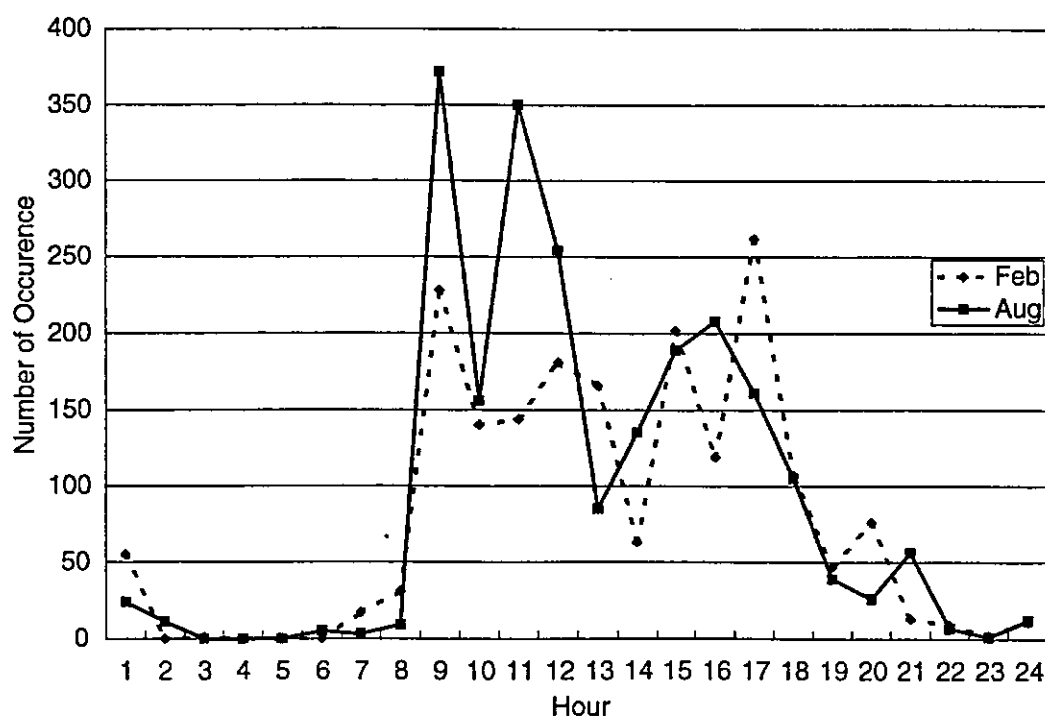


Fig. 2. Time of occurrence of communication/recording tasks. The number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 time periods.

Table 4
Number of occurrences of communication/recording tasks by involved staff's job type

Job type	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Physician	3	0	–	0	5	–
Nurse	75	68	<0.001	42	40	<0.001
Pharmacist	0	0	–	0	4	–
Radiological technologist	1	0	–	2	0	–
PT	3	4	0.999	2	5	0.999
OT	0	0	–	0	7	–
Trainer	0	0	–	0	0	–
Professional carer	99	266	<0.001	49	187	<0.001
Consultant	11	7	0.071	20	20	0.004
Secretary	12	12	0.307	9	54	0.009
Nutritionist	0	7	–	14	1	<0.001
Cook	0	0	–	0	1	–
Driver	5	2	0.150	4	18	0.359
Others	19	0	–	2	1	0.425
Unknown	0	6	–	0	7	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. PT: physical therapist; OT: occupational therapist.

conducted to determine the possible changes in job types of the staff involved, communication routes, tools or media in use and contents of communication/recording.

Table 4 shows the job types of staff involved in communication/recording tasks that occurred in the 8:00–9:00 and 10:00–11:00 periods. From 8:00 to 9:00, more professional carers were involved in communication/recording tasks in August (71.5%) than in February (43.4%) ($P < 0.001$). A significant decrease in the number of nurses involved in communication/recording tasks was also observed between August and February ($P < 0.001$).

From 10:00 to 11:00, more professional carers carried out some kind of communication/recording task in August (53.4%) than in February (34.0%) ($P < 0.001$), while significantly less nurses and consultants were involved in communication/recording tasks ($P = 0.004$, <0.001).

Table 5 shows the communication routes in relation to the tasks that occurred at various time periods. In the 8:00–9:00 period, more staff-staff communication took place in August (54.3%) than in February (37.7%) ($P < 0.001$), while less staff's recording to forms was observed in August ($P < 0.001$). However, in the 10:00–11:00 period, the rate of staff-staff communication decreased in August ($P = 0.002$).

Table 6 shows the means by which communication was conducted at various time periods. In the 8:00–9:00 period, face-to-face conversations were most frequently seen in both sessions (79.8% in February, 71.2% in August). However, despite the increase in the number of occurrences of direct conversation, the rate of overall communication decreased ($P = 0.025$). Also, in the 10:00–11:00 period, a decreased rate of direct conversation was found ($P < 0.001$), and voicemail was more frequently used ($P = 0.019$). In this period, a prominent increase in the number of staff using forms was observed, jumping from 0 to 74 times.

Table 5

Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication route

Communication route	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Staff ⇒ staff	86	202	<0.001	55	83	0.002
Staff ⇒ records	85	21	<0.001	45	134	0.169
Staff ⇒ others ('What')	19	28	0.841	8	16	0.817
Staff ⇒ user(s)	6	1	0.026	1	7	0.514
Records ⇒ staff	2	9	0.292	0	3	–
User(s) ⇒ staff	2	3	0.999	1	5	0.823
Family ⇒ staff	1	8	0.184	1	4	0.999
Records ⇒ records	1	1	0.999	1	8	0.406
Staff ⇒ family	1	0	–	0	3	–
Staff and/or records ⇒ staff	0	41	–	0	3	–
Staff and/or others ('What') ⇒ staff and/or others ('What')	0	19	–	0	1	–
Staff and/or records ⇒ staff and/or records	0	0	–	0	24	–
Others	22	36	0.999	30	54	0.186
Unknown	3	3	0.853	2	5	0.999

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted. 'What' refers to medium.

Table 6

Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by communication tool

Communication tool	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Messages	3	3	0.853	3	14	0.429
Direct conversation	182	265	0.025	65	87	<0.001
Voicemails	1	1	0.999	2	25	0.019
Notes	0	0	–	0	0	–
Wiseman Barcode	6	0	–	18	10	<0.001
Wiseman Keyboard	6	3	0.150	4	24	0.117
Extension calls	3	1	0.311	9	0	–
Outside calls	7	10	0.984	1	16	0.061
Facsimiles	0	4	–	0	2	–
Record entries	7	0	–	15	0	–
Reference to forms	9	6	0.131	0	74	–
Others	4	44	<0.001	27	60	0.767
Unknown	0	35	–	0	38	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.

Table 7

Number of occurrences of communication/recording tasks during the periods of 8:00–9:00 and 10:00–11:00 by content

Communication Tool	8:00–9:00		<i>P</i>	10:00–11:00		<i>P</i>
	February (<i>N</i> = 228)	August (<i>N</i> = 372)		February (<i>N</i> = 144)	August (<i>N</i> = 350)	
Instruction	0	1	–	1	17	0.048
Information	180	148	<0.001	58	42	<0.001
Reporting	6	30	0.011	17	17	0.010
Consultation	3	3	0.853	5	5	0.265
Recording	20	13	0.010	51	131	0.750
Confirmation	19	106	<0.001	11	25	0.998
Others	0	33	–	1	9	0.320
Unknown	0	38	–	0	104	–

Note: A chi square test was conducted between February and August sessions. (–) Indicates that the test could not be conducted.

Table 7 shows the breakdown of contents of communication that occurred in the various periods. In the 8:00–9:00 period, information decreased from 78.9 to 39.8% ($P < 0.001$), but more reporting and confirmation were observed ($P = 0.011$, <0.001). In the 10:00–11:00 period, information decreased again from 40.3 to 12.0% ($P < 0.001$) while instruction increased ($P = 0.048$). With respect to reporting, the rate in all communication tasks decreased significantly ($P = 0.010$).

4. Discussions

4.1. Background of the increase in total number of users and communication/recording tasks

This research reveals an increase in total number of users after the introduction of Japan's elderly care insurance system. Even before the implementation of the system, a quantitative increase both in number of users and provision of services (Wada, 1996) had been predicted. In fact, traditionally, the administration (Hattori et al., 2000) determined the nursing services to be provided to users (Hashimoto, 1996; Wada, 1996), but under the new system, users are able to choose the nursing services they wish to receive. The findings of this research seem to support this prediction.

On the other hand, although the overall rate of increase in the number of occurrences of communication/recording tasks was greater than that of users, the analysis of the 153 users who had already used some nursing services before the new system was launched did not reveal any significant increase in the number of occurrences of communication/recording tasks for such users. This suggests that the increase in communication/recording tasks for new users after the adoption of the system was reflected on the overall increase in the number of occurrences of communication tasks. In addition, the possible lack in necessary medical and/or nursing-related information on these new users may have lead to greater information exchange among staff.

Meanwhile, the 153 former users may have benefited from the fact that such information had already been gathered in the institution as they had started using services before the system was launched. However, no trend toward a decrease in the number of communication/recording tasks was observed among these users. The introduction of the elderly care insurance system has undoubtedly brought about some increase in communication tasks. For example, the system requests preciseness in procedure such as the preparation of care plans and the management of nursing service provision, both of which necessarily involve more frequent information exchanges. Also, following the adoption of the system, changes in the type and frequency of services made by users may trigger an increase in communication/recording tasks. According to a report, daycare service provisions increased and short-stay service decreased after the system was introduced in Japan (Miyatake, 2001), and this could also be the case in the subject institution. Changes in users' choices from short-stay service to daycare may prompt an increase of communication/recording tasks because the latter is provided per day and requires more information exchange among staff in comparison with the former. The types and frequency of services in use were not studied in this research. However, an increase in daycare and a decrease in short-stay were observed in the category of utilized services in this research, in agreement with the above-mentioned report.

4.2. *Time of occurrence of communication/recording tasks*

Firstly, communication tasks were observed more often in the 8:00–11:00 and 14:00–17:00 time periods. The subject institution is open from 9:00 to 16:30, and at 8:30–9:00 and 16:00–16:30, short staff meetings are held for the purpose of exchanging information on short-stay users. The peaks of occurrence of communication/recording tasks in the morning and the afternoon fall respectively around the opening and closing times of this institution, presumably because of these correspond to those times when greater information exchange occurs and patient updates are provided.

Secondly, there are various possible factors behind the steep increase in the number of communication/recording tasks in the 8:00–9:00 and 10:00–11:00 time periods. As mentioned above, these periods fall around the opening time of the institution. In fact, it is inferable that the 8:00–9:00 period corresponds to the time when patient updates and information exchanges take place before opening.

Regarding job types of staff, a more prominent increase in the number of professional carers was noticed as compared to other staff. This suggests that the introduction of the new insurance system may have increased the number of communication/recording tasks performed by the professional carers during specific periods of time. Meanwhile, some reports have indicated that a greater number of inpatient falls occurred during those periods of time when the nurses were busy performing a communication or recording task (Taira et al., 1999; Kanemura et al., 2000). In facilities where nursing care services are also provided, the rush of communication tasks may deteriorate the quality of nursing services and increase the risk of accidents on the part of users. It thus appears necessary to take some measures to prevent such concentration of communication tasks. However, this study is limited in the sense that it does not shed adequate light on the burden put on the professional carers for the following reasons: (1) the study focused on the number of communication

tasks, not the needed time for a task to be performed, (2) the study did not take into account the number of such tasks performed by each professional carer, and (3) the number of professional carers rose from 72 to 78 between the two sessions of this research.

Regarding communication route, significantly more staff-staff communication and less staff-form recording were observed in the 8:00–9:00 period. In terms of tools, including form of communication, a prominent increase in face-to-face conversation was recorded. This suggests that information exchange in the form of direct conversation among the staff increased. In the 10:00–11:00 period, however, the rate of staff-staff communication decreased. The use of voicemail, keyboard and reference to records seemed to decrease the rate of direct conversation and staff-staff communication. In terms of tools, a significant increase was seen in the use of voicemail and keyboard as well as reference to records, and the rate of direct conversation in all communication/recording declined. The promotion of the use of such tools in the 8:00–9:00 period also can be expected to curb the rate of increase of communication/recording tasks.

With respect to contents, the following were observed: a decrease of information and an increase of report and confirmation in the 8:00–9:00 period, as well as a decrease of information and an increase of instruction in the 10:00–11:00 period. The possible reasons for the decrease of information in both periods are: (1) the call for a more precise implementation of care plans following the introduction of the system, (2) the increased number of reports and confirmation in place of information, and (3) the diminished necessity for simultaneous communication such as short staff meetings to share information thanks to IT driven devices. Meanwhile, the increase of report, confirmation and instruction around the opening time is presumably due to the preciseness requested by the new insurance system both in the contents of tasks and the time to provide services.

4.3. Possibility of applying information technology

The outcome of this research highlights the necessity for greater operating efficiency of communication/recording tasks. IT driven devices such as groupware are effective as they facilitate sharing, storage, retrieval and reutilization of information (Shintani, 2000; Nishimura, 2001; Rowe and Brimacombe, 2003). In this research, an increase of report, confirmation and instruction was observed in terms of content of communication. The use of IT driven devices on users and individual progress reports may help reduce the need for report and confirmation (Rowe and Brimacombe, 2003). Also, instruction can be more efficiently conducted when past instructions have been easily stored and can be retrieved and reutilized as needed.

Moreover, when IT driven devices are used, the staff can work more freely with less restrictions of time or space (Nishigaki, 1994; Nishimura, 2001). IT devices also contribute to alleviate the rush of communication/recording tasks, as previously suggested in this research.

Other benefits of IT systems can also be expected for users as the time normally devoted to communication tasks may be spent on the nursing service itself.

Although the use of IT is undoubtedly beneficial, as demonstrated above, we should nevertheless solve some of the most pressing disincentives which include cost, safety, staff

education, and delayed development of user-friendly peripheral tools, in order to efficiently apply IT driven devices.

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CORRESPONDENCE

Survival rate after percutaneous endoscopic gastrostomy in a long-term care hospital

Dear Sir,

We previously reported the mortality after percutaneous endoscopic gastrostomy (PEG) in a general hospital.¹ The results showed a higher survival rate (30-day survival rate: 92.5%, 1-year survival rate: 64.0%, 2-year survival rate: 55.5%, mean age ± SD at PEG: 75.7 ± 14.1 years) than the results in other studies.²

In this study we surveyed the survival rate of 93 consecutive patients older than 65 years (mean age: 80.3 ± 7.4 years) who received PEG by reviewing their charts in a long-term care hospital. Because the hospital has an affiliated nursing home, home-visit nursing and day care centers for the frail elderly, we could track the record of survival in 84.9% of the post-PEG patients at the time of survey. The primary diagnoses whose symptoms required the patients to receive PEG were: cerebrovascular disease (61.3%), Alzheimer's dementia and/or vascular dementia (15.1%) and brain injury (4.3%). Most patients were severely disabled, showing a mean of 5.5 ± 1.2/6 on the score of Cognitive Performance Scale³ (only one patient showed intact cognitive performance) and a mean of 0.8 ± 3.0/20 on Barthel Index.⁴

Fig. 1 shows the Kaplan–Meier's survival curve after PEG. The survival rate was 88.9% at 30 days, 59.1% at 1 year and 52.0% at 2 years. The mean fully observed survival period was 382.3 ± 485.2 days. Age was a significant predictor for the survival period ($\beta = -18.7, P = 0.008$). The relative risks of serum total protein < 6.0, white blood count > 12,000, and coexisting decubitus at the time of PEG for the death at 1 year after PEG was 1.33 (95% CI; 0.77–2.28, $P = 0.263$), 1.79 (95% CI; 1.10–2.93, $P = 0.080$) and 1.29 (95% CI; 0.78–2.13, $P = 0.228$), respectively.

The 30-days, 1-year and 2-year survival rates of post-PEG patients in a long-term care hospital were

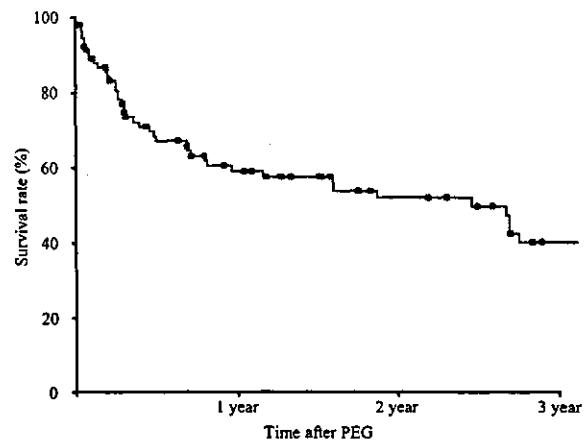


Figure 1 Kaplan–Meier survival curve after PEG. (●) Censored (dead) cases; PEG, percutaneous endoscopic gastrostomy.

lower than those in a general hospital. According to the 2002 annual report released by the Ministry of Health, Welfare and Labor of the government, the mean length of patients' hospital stay was 22.2 days in general hospitals, and 179.1 days in long-term care hospitals in Japan. By the current political pressure of shortening the length of stay in acute hospitals, the number of patients receiving PEG in long-term care hospitals has been constantly increasing. As shown in the results, the patients in long-term care hospitals usually have severe functional disabilities relative to those in acute hospitals. Under the circumstances, it is crucial to build up evidences regarding the post-PEG prognosis in long-term care hospitals.

In summary, the results indicate lower survival rates for post-PEG patients in a long-term care hospital than those in a general hospital. We believe that the present findings add some insights to the application of PEG in the long-term care.

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Effects of home massage rehabilitation therapy for the bed-ridden elderly: a pilot trial with a three-month follow-up

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Objectives: To assess the effects of home massage rehabilitation therapy on the bed-ridden elderly.

Design: Alternately allocated trial.

Setting: Subjects' homes, three home nursing stations, 13 visit care stations and one day service centre in Aichi prefecture, Japan.

Subjects: Bed-ridden patients who were 65 years and above, no dementia, stable general condition, and no rehabilitation therapy.

Intervention: Thirty-minute sessions of home massage rehabilitation therapy by a massage practitioner 2 or 3 days a week for three consecutive months or usual care.

Main measurements: Barthel Index (BI), Subjective Satisfaction and Refreshment Scale, Apathy Scale and Self-rating Depression Score.

Results: Fifty-three subjects were recruited, 26 in the home massage rehabilitation group (HMG) and 27 in the routine care group without massage (RCG). The protocol was completed for 40 subjects, 22 in the HMG and 18 in the RCG. There were no significant differences between the baseline characteristics of both groups; 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). The total BI score of the HMG (15.27 ± 4.51) at baseline was nonsignificantly lower ($p = 0.03$) than those of the RCG (11.44 ± 5.90). Subjective satisfaction and refreshment scale, Apathy Scale and Self-rating Depression Score of both groups at baseline were matched ($p = 0.12, 0.32$ and 0.89 , respectively). There were no statistical differences between the intergroup changes over time in BI, Subjective Satisfaction and Refreshment Scale, Apathy Scale and Self-rating Depression Score ($p = 0.35, 0.08, 0.70$ and 0.55 , respectively).

Conclusion: Home massage rehabilitation therapy did not show a positive effect on the bed-ridden elderly mentally and physically. We would require large-size trials to determine whether it is effective.

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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).

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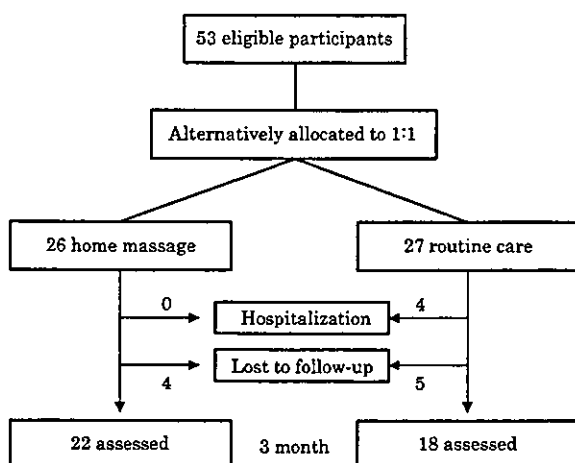


Figure 1 Flow diagram for the trial.

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
Staris (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 asses-

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
Staris (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
	Hospitalization	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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