2. Methods

2.1. Subject and sessions of research

The subject of this research is a medical institution located in the Mikawa region of Aichi Prefecture, Japan. The institution consists of a clinic with a rehabilitation facility (Clinic), a geriatric intermediate care facility (GICF) (providing a certain amount of medical care), an In-home nursing support center, a helper's station, and a visiting care station, providing nursing services such as visiting medical care, visiting rehabilitation, rehabilitation for outpatients, visiting nutrition guidance, and short-stay services.

The research was conducted in two sessions in February 2000 and August 2000, namely before and after the nationwide introduction of the elderly care insurance system. At each session, all the communication/recording tasks that occurred in relation to nursing service provisions during a continuous 48 h were recorded.

Given the fact that no significant variation in terms of number of users on workdays was shown in a preliminary research, Tuesdays and Wednesdays were selected for both the February and August sessions.

2.2. Content of research

A fill-out-type questionnaire was designed and used for the research (see Fig. 1). The items to fill out were: (1) nursing service in use, (2) type of job, (3) date and time, (4) from whom/what, (5) to whom/what, (6) communication tools and (7) content. The entry was performed by the staff carrying out each particular communication task. A preliminary meeting was held for orientation and instruction as well as to identify any problems with the procedure. The management of the forms was conducted by off-duty staff trained in advance. They were stationed at each facility and their duty was to check and collect the forms as appropriate.

2.2.1. Category of nursing services in use

Utilized in-home nursing services in relation to specific communication tasks were categorized as follows: daycare service at clinic, daycare service at GICF, short-stay service at GICF, in-home helper service, visiting nursing, visiting nutrition guidance, visiting rehabilitation, visiting medication, and others.

2.2.2. Job type

The job types of the staff involved in communication tasks were categorized as follows: physician, nurse, pharmacist, radiological technologist, physical therapist (PT), occupational therapist (OT), trainer, professional carer, consultant, secretary, nutritionist, cook, driver, and others.

2.2.3. Date and time

The specific dates and times when communication tasks occurred were recorded.

2.2.4. From whom/what and to whom/what

When a communication event occurred, the names of the persons involved were recorded in the columns 'From' and/or 'To whom'. When information was referenced and/or recorded

Nursing service in use	Daycare at Clinic	Daycare at Center	Short-stay at Center	Helper	Visiting care	Visiting nutrition guidance	Visiting rehabilitation
User's name	Mr./Ms.			Home visit	Others ( )		
Entered by:				Medical Doctor	Nurse	Pharmacist	Radiological Technologist
Type of Job	PT	OT	Trainer	Nursing staff	Consultant	Office worker	
	Nutritionist	Cook	Driver	Others			
Date/hour of occurrence	Date: day, dd/mm/yy Hour: hh/mm am./pm.						
From whom	Family	User	Staff		Others ( )		
From what	Form/Notes/Voicemail/Others ( )						
To whom	Family	User	Staff		Others ( )		
To what	Form/Notes/Voicemail/Others ( )						
Communication tool	Message	Face-to-face conversation	Voicemail	Notes	Wiseman barcode		Wiseman keyboard
	Extension	Outside line	Facsimile	Entry in charts	Others ( )		
Brief content	Instruction (prescription)		Info	Report	Consultation	Record	Confirmation

Fig. 1. Questionnaire on communication tasks.

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	P
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 ($N = 1883$)	August ($N = 2244$)	P
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 (N = 1883)	August (N = 2244)	P
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

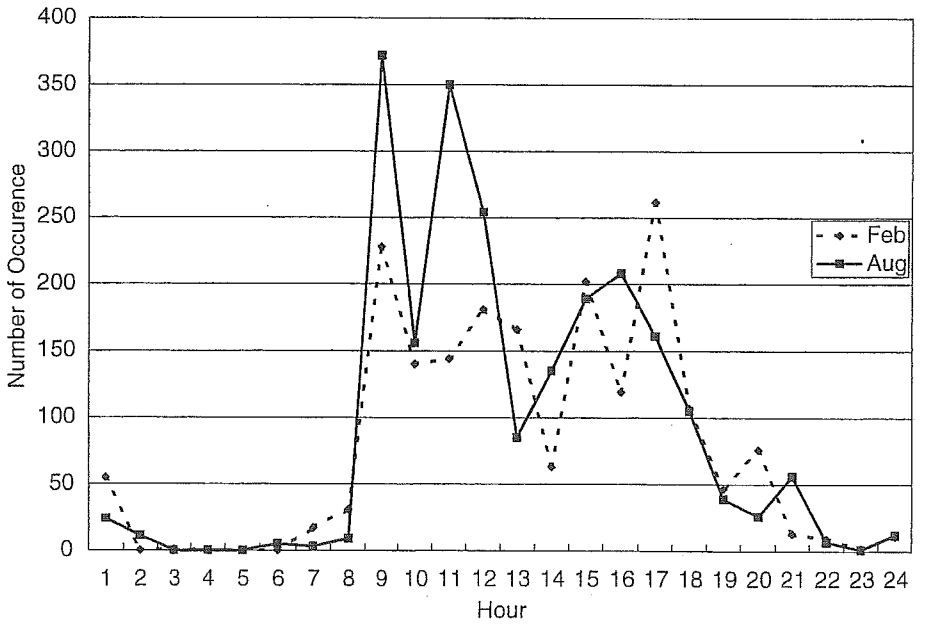

Fig. 2. Time of occurrence of communication/recording tasks. The number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 time periods.

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

Job type	8:00–9:00		P	10:00–11:00		P
	February ($N = 228$)	August ($N = 372$)		February ($N = 144$)	August ($N = 350$)	
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		P	10:00–11:00		P
	February ($N = 228$)	August ($N = 372$)		February ($N = 144$)	August ($N = 350$)	
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		P	10:00–11:00		P
	February ($N = 228$)	August ($N = 372$)		February ($N = 144$)	August ($N = 350$)	
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		P	10:00–11:00		P
	February ($N = 228$)	August ($N = 372$)		February ($N = 144$)	August ($N = 350$)	
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 chose 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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ORIGINAL ARTICLE

Current admission policies of long-term care facilities in Japan

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Background: The rapidly aging society in Japan is putting demands on long-term care facilities for the elderly who require care. In Europe and the USA, there is ongoing reform of elderly care services, but the establishment of system based on social insurance is still being explored in Japan.

Methods: Two studies were conducted, the first in 2000 and the second in 2001, involving 91 long-term care facilities located in or around the city of Nagoya. Questionnaires were sent to facility directors, chief administrators or head nurses to inquire about their admission policies for six major patient categories. Two educational lectures on methicillin-resistant *Staphylococcus aureus* (MRSA) and urinary incontinence were given between the distribution of the questionnaires.

Results: For all six categories featured on the questionnaire, the acceptance rate in both studies was the highest in geriatric hospitals, and an improvement in acceptance rates was seen in the second study in all three types of care facilities. When the effect the lectures had on changes in admission policies at these facilities was examined, no correlation was found.

Conclusions: Lectures should be given to facility management and personnel to raise their awareness of key issues and improve their efficiency.

Keywords: acceptance rates, admission policies, lectures, long-term care facility, MRSA.

Introduction

Japan has the fastest growing aging society in the world.[1] As with other developed countries, advanced medical technology has contributed to a considerable increase in life span and as a result, the number of elderly who require care has been increasing steadily, and the demand for institutional care is likely to intensify in the future. In Europe and North America, where a more gradual shift to an aging society has occurred, innovative elderly care services are being explored[2] and reforms are ongoing. In April 2000, a public long-term care insurance system was introduced in Japan, and ways to establish an elderly care system based on social insurance were explored. Based on the 'Gold Plan' and 'New Gold Plan'[3] formulated by the Health and Welfare Ministry, a reorganization of care facilities including nursing homes (NH), geriatric intermediate care facilities (GICF, which provide a certain amount of medical care), and geriatric hospitals (GH)[4,5] was initiated. In order to improve facility standards and personnel placement, the two plans recommend the sharing of expertise by emphasizing more nursing care in nursing homes and more medical care in GICF and GH.[2,5] However, reports have shown that the elderly do not systematically have access to institutional services[3] because of an insufficient number of long-term care facilities[3] and restrictive acceptance policies that limit the admission of carriers of methicillin-resistant *Staphylococcus aureus* (MRSA) and persons with other conditions.[6–8]

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It appears that admission to long-term care facilities is more frequently denied to the following types of patients: bacteria carriers, including MRSA carriers and *Pseudomonas aeruginosa* carriers, and persons requiring medical care, including nasogastric tube-feeding, persons requiring indwelling urinary catheter, persons requiring intermittent catheterization, patients with tracheostoma and patients who require intravenous hyperalimentation. Various studies have so far examined admission policies for MRSA carriers,[6,9] but very few have focused on other conditions. Therefore, we conducted two studies to examine the possible factors that prevent the admission of certain elderly patients into long-term care facilities. The first study was carried out in June 2000, immediately after the new public insurance plan was introduced, and the second in May 2001. In addition to MRSA status, we examined five other possible factors for admission refusals in long-term care facilities.

A general lack of knowledge among medical and welfare staff has been shown to be the primary factor for admission refusals of patients with MRSA infections[7] and the same holds true for elderly persons requiring a urinary catheter. Therefore, between the first and the second study, we gave two lectures to participating facilities, one on MRSA and one on urinary incontinence, in order to examine the effect of education on admission policies.

Methods

The study group comprised 91 long-term care facilities (35 NH, 40 GICH, 16 GH), all located within 20 km of the city of Nagoya. A telephone survey was conducted with either the director, chief administrator or head nurse of each facility and prior to the telephone survey, a questionnaire was sent to all facilities to inform them of the study. Some of the participants answered the questionnaire by mail, and we therefore did not need to telephone them.

The survey was carried out twice, once in June 2000, and later in May 2001. Using the same questionnaire on both occasions, we inquired about the facilities' admission policy for the following types of elderly patients: (1) MRSA carriers, (2) *P. aeruginosa* carriers, (3) nasogastric tube-fed persons, (4) gastrostomy tube-fed persons, (5) persons requiring an indwelling urinary catheter, and (6) persons requiring intermittent catheterization (Table 1). Additional questions about the admission policy for patients with a tracheostoma and patients requiring intravenous hyper alimentation were added to the questionnaire that was distributed to GH.

We categorized responses as 'possible' if the answer to whether or not the facility would admit someone with conditions attached. We categorized answers such as 'under consideration' or 'we would consider admission on a case by case basis' as 'others', and did not include these in our statistical analysis. In both studies, the acceptance rate was compared and examined among the NH, GICF, and GH for each question on the survey. In addition, we looked at the change in acceptance rates from 2000 to 2001 for each type of facility examined.

Table 1 Questionnaire: The study on the current admission policy in the long term care facility. Please answer the following questions. Your answers will be gathered and analyzed statistically. Your privacy is strictly protected.

1 Acceptance of MRSA carriers
1. Possible 2. Impossible 3. Others ( )

2 Acceptance of *Pseudomonas aeruginosa* carriers
1. Possible 2. Impossible 3. Others ( )

3 Acceptance of nasogastric tube-fed persons
1. Possible 2. Impossible 3. Others ( )

4 Acceptance of gastrostomy tube-fed persons
1. Possible 2. Impossible 3. Others ( )

5 Acceptance of persons requiring an indwelling urinary catheter
1. Possible 2. Impossible 3. Others ( )

6 Acceptance of persons receiving intermittent catheterization
1. Possible 2. Impossible 3. Others ( )

For the hospitals only

7 Hospitalizing patients with a tracheostoma
1. Possible 2. Impossible 3. Others ( )

8 Hospitalizing IVH
1. Possible 2. Impossible 3. Others ( )

Thank you very much for your cooperation. We will gather information by the phone at a later date.

Between the distribution of the first and second questionnaire, lectures on MRSA and urinary incontinence were given to facility personnel, who attended these lectures voluntarily. We then categorized the facilities into two groups, a participating group, consisting of facilities whose personnel had attended the lectures, and a non-participating group (facilities where lectures had not been given). The lecture on MRSA focused mainly on general characteristics, pathogenicity, and infectivity. The lecture on urinary incontinence covered classification, causes, and means by which people adapt to having intermittent catheterization. The effect of the lectures was examined by comparing the pre- and postlecture acceptance rates.

Statview-J5.0 was used for analysis. Chi-squared test was used to compare the acceptance rates between three groups and between 2000 and 2001. Paired *t*-test was used to compare the acceptance rates between pre- and post lecture. The statistically significant difference was set at $P < 0.05$.

Results

In the study conducted in May 2000, 26 NH (74.3%), 34 GICF (85%), and 14 GH (87.5%) responded to our questionnaire, and in the second study on June 2001, 29 NH (82.9%), 35 GICF (87.5%), and 13 GH (81.3%) responded.

On whether they would admit MRSA carriers, in the first study, 8 NH (33%), 12 GICF (40%), and 7 GH (54%) replied 'possible', and in the second study, 9 NH (43%), 21 GICF (64%), and 7 GH (58%) gave that answer. In both studies, no statistically significant difference was found in the admission rates among the NH, GICF, and GH, despite the fact that acceptance rates in each facility did improve, as the second study results indicate (Fig. 1).

On whether they would accept *P. aeruginosa* carriers, in the first study, 8 NH (33%), 13 GICF (45%), and 8 GH (62%) responded 'possible', and in the second study, 13 NH (52%), 23 GICF (72%), and 8 GH (73%) replied 'possible'. In both studies, the GH showed the highest acceptance rate, followed by the GICF and NH, but no statistically significant difference was found among the facilities. Each type of facility improved their admission rate, as the second study results show, and a statistically significant difference was found in the GICF ($P < 0.05$) (Fig. 2).

On whether they would admit nasogastric tube-fed patients, in the first study, 12 NH (46%), 26 GICF (81%), and 13 GH (93%) answered 'possible', and in the second study, 16 NH (66%), 28 GICF (88%), and 12 GH (100%) responded 'possible'. In both studies, the GH had the highest acceptance rate, followed by the GICF and NH. In the first study, a statistically significant difference was found between the NH and GICF ($P < 0.01$), and in the second study, between the NH and GH ($P < 0.05$). Each type of facility improved their acceptance rate in the second study, but no statistically significant difference was found (Fig. 3).

On whether they would accept gastrostomy tube-fed patients, in the first study, 12 NH (46%), 24 GICF (73%), and 13 GH (93%) replied 'possible', and in the second study, 16 NH (67%), 28 GICF (90%), and 13 GH (100%) answered 'possible'. Both studies revealed similar responses to the question of whether the facilities would admit nasogastric tube-fed patients. In the first study, a statistically significant difference was found between the NH and GICF ($P < 0.05$), and between the NH and GH ($P < 0.01$), and in the second study, between the NH and GICF ($P < 0.05$), and between the NH and GH ($P < 0.05$). Each type of facility showed an improvement in their acceptance rates in the second study, but no statistically significant difference was found (Fig. 4).

On whether they would accept patients requiring an indwelling urinary catheter, in the first study, 19 NH (73%), 29 GICF (88%), and 13 GH (93%) answered 'possible', and in the second study, 23 NH (92%), 32

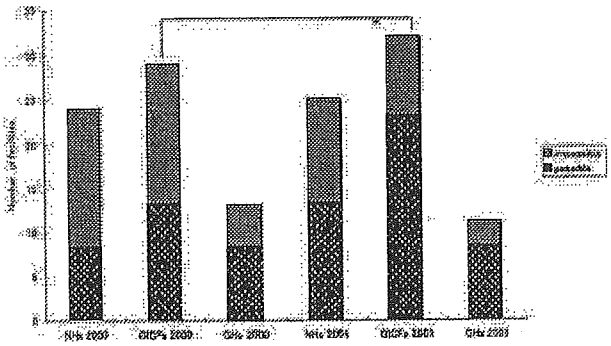

Figure 2 Admission policy for *Pseudomonas aeruginosa* carriers. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001: $^{*}P < 0.05$.

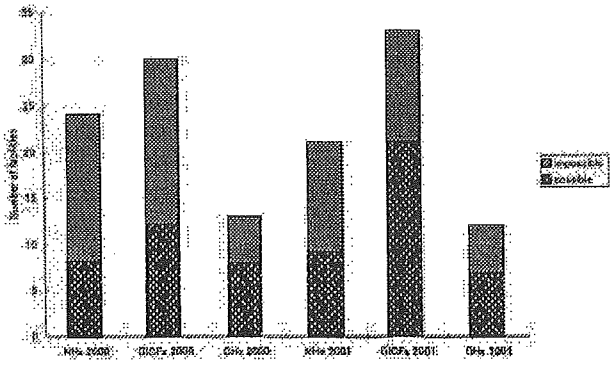

Figure 1 Admission policy for MRSA carriers. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001. P value did not reach statistical significance.

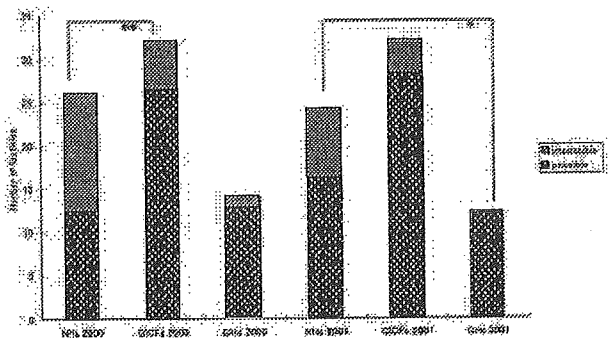

Figure 3 Admission policy for nasogastric tube-fed persons. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001: $^{*}P < 0.05$, $^{**}P < 0.01$.

GICF (94%), and 13 GH (100%) responded 'possible'. As seen with the other responses, the acceptance rate was the highest in the GH, followed by the GICF and NH, but no statistically significant difference was found. Each type of facility showed an improvement in their acceptance rates in the second study, but no statistically significant difference was found (Fig. 5).

On whether they would admit patients requiring intermittent catheterization, in the first study, 15 NH (58%), 19 GICF (66%), and 12 GH (86%) replied 'possible', and in the second study, 12 NH (57%), 26 GICF (87%), and 10 GH (83%) answered 'possible'. The acceptance rates in each type of facility showed the same tendency as that observed for the question on the acceptance of patients requiring an indwelling urinary catheter, except for the difference between the GICF and GH that appeared in the second study. A statistically significant difference was found between the NH and GICF in the second study ($P < 0.05$). Each type of facility improved their acceptance rates in the second study, but no statistically significant difference was found (Fig. 6).

The admission rate of NH for all six categories, in the first study, was found to be 33% for MRSA carriers as well as *P. aeruginosa* carriers, the lowest of all, and in the second study, 43%, again the lowest of all (Fig. 1). In both studies, a statistically significant difference was found between the admission rates for MRSA carriers and that for patients requiring an indwelling urinary catheter ($P < 0.01$). The lectures on MRSA were attended by 26 facilities (28.6%) and 28 (30.8%) attended those on urinary incontinence. In order to examine the effect of these lectures, we investigated only those facilities that had answered both questionnaires in 2000 and 2001, dividing them into participating and non-participating groups.

For the lecture on MRSA, we studied 61 facilities (20 in the participating group, 41 in the non-participating), and for the lecture on urinary incontinence, 61 facilities (18 in the participating group, and 43 in the non-participating). An improvement in the acceptance rates for MRSA carriers was observed in the second study, in both groups. A statistically significant difference was not found in the change of the acceptance rate in either group (Fig. 7).

For the lecture on urinary incontinence, the number of facilities in the-non-participating group that answered that it would be impossible for them to accept patients requiring intermittent catheterization decreased from 15 to 7, and the number of facilities that provided answers that we categorized as 'others' increased from 4 to 9. However, no statistically significant difference was found in either group (Fig. 8).

Finally, the responses to the questions added to the surveys distributed to the GH showed that 10 of 14 facilities deemed it 'possible' to accept patients with a tracheostoma, and 8 of 14 facilities considered it 'possible' to accept patients with intravenous alimentation

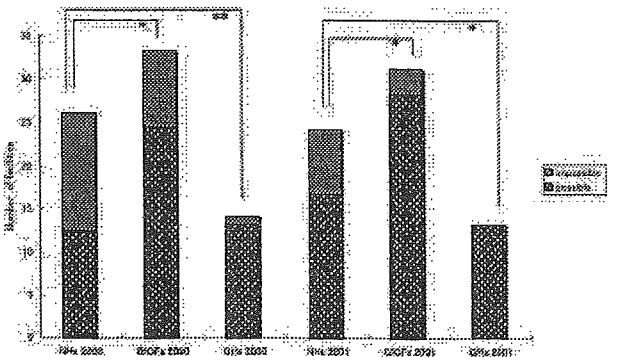

Figure 4 Admission policy for gastrostomy tube-fed persons. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001: $^{*}P < 0.05$.

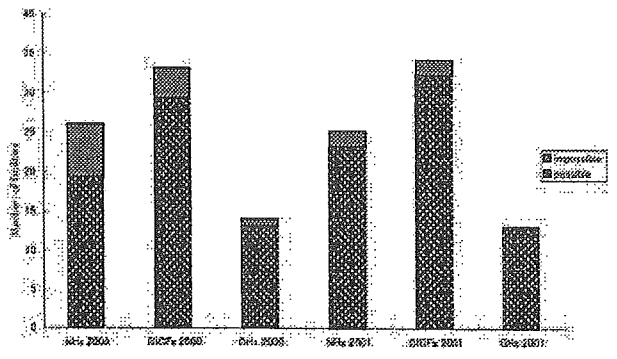

Figure 5 Admission policy for persons requiring an indwelling urinary catheter. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001. *P* value did not reach the statistical significance.

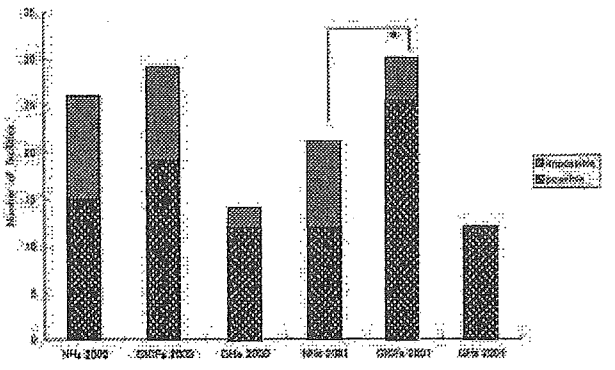

Figure 6 Admission policy for persons requiring intermittent catheterization. Chi-squared test was performed to compare acceptance rates between 3 groups and between 2000 and 2001: $^{*}P < 0.05$.

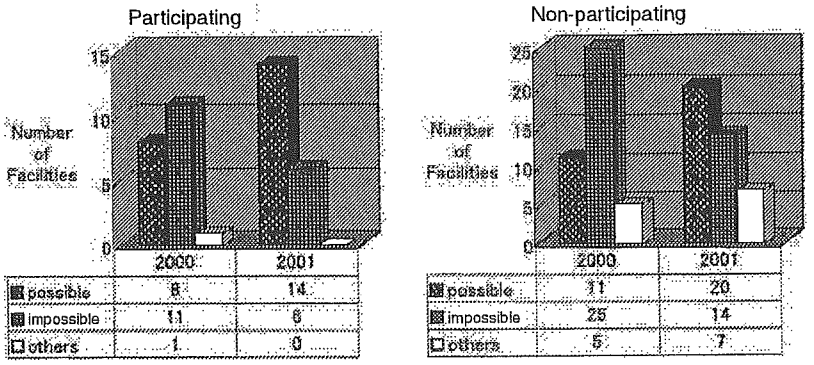

Figure 7 Effect of the lecture on MRSA on admission rates. The numbers are the sum of 3 groups. Paired *t*-test was performed to compare acceptance rates between 2000 and 2001. *P* value did not reach statistical significance.

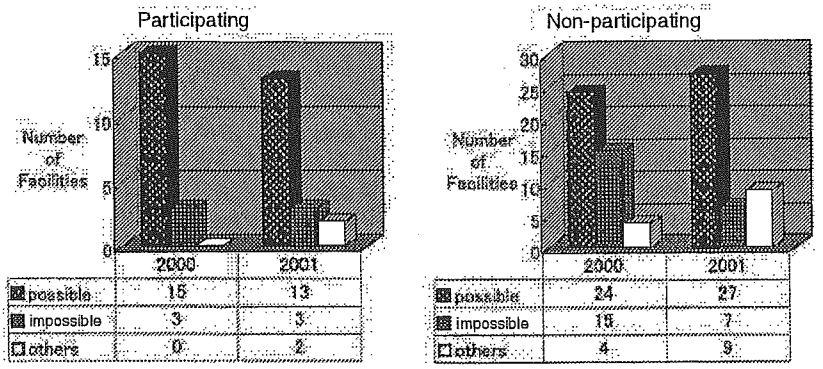

Figure 8 Effect of the lecture on urinary incontinence on admission rate. The numbers are the sum of 3 groups. Paired *t*-test was performed to compare acceptance rates between 2000 and 2001. *P* value did not reach statistical significance.

in the first study. In the second study, 9 of 13 facilities responded that it would be 'possible' for them to accept patients with a tracheostoma, and 8 of 13 facilities said that it would be 'possible' for them to accept patients with intravenous alimentation.

Discussion

The aim of this study was to clarify the admission policies that are currently in place in long-term care facilities by studying 91 such facilities (NH, GICF, and GH) in and around the city of Nagoya.

As possible factors affecting admission policies, we defined six categories: (1) MRSA carriers, (2) *Pseudomonas aeruginosa* carriers, (3) nasogastric tube-fed patients, (4) gastrostomy tube-fed patients, (5) patients requiring an indwelling urinary catheter, and (6) patients requiring intermittent catheterization.

With regards to MRSA carriers, a number of studies show a positive correlation between MRSA colonization and a higher death rate 6 months later.[10] Other research, however, indicates that there is no clear causal relationship between MRSA colonization and infection in long-term care facilities.[9] It has also been pointed out that infection and the prevalence of MRSA would not occur in long-term care facilities that practised strict isolation[6,11,12] because unlike hospitals, long-term care facilities are rarely overcrowded with patients taking antibiotics,[7] those with a central venous catheter[13] and critically ill patients[6] all of whom are considered to be the biggest carriers of this infection. Therefore, some studies have suggested that refusing admission to MRSA carriers into long-term care facilities is discriminatory.[6,14] In our study, the acceptance rate for MRSA carriers in NH was 33% in 2000, and 43% in 2001. The results obtained in a previous study by Washio and Fujishima,[7] who reported that the acceptance rate for MRSA carriers was 33.3% in nursing homes, are consistent with our results. Although the acceptance rate for MRSA carriers in NH improved in the second study, it was still low in comparison with the other five categories, which suggests that refusing to admit MRSA carriers is an ingrained response by these facilities. The acceptance rate for *P. aeruginosa* carriers is also low in NH and the results indicate that patients who are carriers of other bacteria might be also dealt with unfairly. There is a pressing need for facility personnel to receive education on the nature and management of these conditions, and for further studies to be conducted.

The acceptance rate for nasogastric tube-fed patients, gastrostomy tube-fed patients, and patients requiring an indwelling urinary catheter were the highest in GH, followed by GICF and NH in both studies. GICF had a higher acceptance rate for patients requiring intermit-

tent catheterization than GH in 2001, but overall the rate was the highest in GH, followed by GICF and NH. Because all these conditions are categorized as requiring medical care, it seems appropriate that the highest acceptance rate was found in GH, where medical facilities, medical care and medically trained staff are more readily available than in GICF and NH. However, some reports have indicated that GH residents do not all require medical care, and that there are high medical demands in NH.[5,15] Therefore, our results do not necessarily reflect the fairness and appropriateness of the admission policies we investigated. In addition, we did not ask the facilities whether or not they had sufficient staff to take care of additional residents, although a shortage of care staff may be one of the reasons why facilities claimed they were unable to accept new residents from the four categories chosen for the study. Because the shortage in human resources for geriatric care has long been recognized and studied,[16] the government needs to examine its standards of human resource placement as a factor in limiting the admission of elderly who require care into long-term care facilities.

A comparison of the results from the two studies shows that, except for a decline in the acceptance rates for persons receiving intermittent catheterization seen in NH and GH, all of the facilities improved their acceptance rates for all patient categories. In particular, the acceptance rate for *P. aeruginosa* carriers in GICF in the second study showed a statistically significant difference. These improvements probably reflect the ongoing efforts made by these facilities to improve care. Other possible reasons are that, because of the introduction of the public long-term care insurance plan, senior citizens now have more choices of where to obtain care. Also, the expansion of care facilities has stimulated competition among them[3,5] and we assume that therefore long-term care facilities are concerned that their admission refusals could create a negative reputation among the elderly, of which there are many, still awaiting admittance into these facilities.[17,18] We did not investigate this issue in the present study, but expect to in the future.

The effect of the lectures on a change in admission policies was examined, but no correlation was found. We first assumed that lecture participants would mainly be care staff and decided that basic, practical information was appropriate for them. Thus, we focused on the general characteristics, pathogenicity, and infectivity of MRSA, and the classification, causes, and means by which people adapt to receiving intermittent catheterization for urinary incontinence. However, the lectures were mainly attended by chief administrators and directors, and not by the staff members who actually care for the elderly in these facilities. The content of the lectures might have been inappropriate; instead they should have been specifically aimed at encouraging admission. Yet another possible reason for the results obtained is that both the participating and the non-participating groups already had some prior knowledge of these conditions. If that is the case, then public information or guidelines on admission policies may be needed, rather than knowledge. Further examination into the type of information that should be provided and the level of knowledge of participants is needed.

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ORIGINAL ARTICLE

Factors associated with long hospital stay in geriatric wards in Japan

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Background: To reduce the length of stay (LOS) in hospital, the factors associated with extended LOS have to be identified.

Methods: A comprehensive geriatric assessment (CGA) of patients in a geriatric ward was carried out to identify the factors associated with LOS of more than 28 days.

Results: Of 193 patients (> 65 years old) who had been admitted to the geriatric ward of Nagoya University Hospital from home, 118 patients had complete CGA data sets. The CGA items were studied within 1 week of admission and analysis was performed by Chi-squared followed by multilogistic analysis. Chi-squared analysis demonstrated that many of the basic activities of daily living (BADL) and instrumental ADL (IADL) had a significant association with longer LOS, but the contribution of psychological factors, assessed by mini-mental state examination and Geriatric Depression Scale-15, was relatively small. Multilogistic analysis showed that dependence on dressing assistance and medication assistance significantly increased the chance of having a LOS longer than 28 days.

Conclusion: Intervention to improve the ability to dress and take medication independently may reduce LOS.

Keywords: activities of daily living, comprehensive geriatric assessment, length of stay.

Introduction

In many countries including Japan, increasing medical costs are an urgent issue, and one of the main contributing factors is length of stay (LOS) in hospital. Patients in geriatric wards generally have a long LOS and reducing that time is one way of reducing medical costs, not necessarily only for administrative reasons, but also from the clinical point of view because unnecessarily long hospitalization may result in a decline of in the ability to perform activities of daily living (ADL) or contracting an infectious disease.

A comprehensive geriatric assessment (CGA) is a multidisciplinary diagnostic process that includes the medical, psychosocial, and functional aspects of the subject.[1] CGA followed by therapy is called geriatric evaluation and management (GEM), which has been shown to be effective in several aspects including improved functional status, less placements in nursing homes, and improved diagnostic accuracy.[2,3]

However, few studies have demonstrated the impact of GEM on LOS. One study in France showed that GEM reduced prolongation of LOS for non-medical reasons, but did not have a measurable impact on the duration of hospital stay.[4] Collard *et al.* showed that in an acute care setting LOS was reduced and the total charge was lowered after GEM, although the effect was relatively limited.[5]

To strengthen the impact of GEM on LOS, the factors associated with long LOS have to be identified and then more progressive intervention can be done.

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Methods

Subjects

The study group were 289 elderly (> 65 years old) patients who were admitted to a geriatric ward between 1 September 1998 and 31 December 2000. Of these, 211 underwent CGA within 1 week of admission to hospital; CGA was not performed in 78 patients because of severe acute illness. Referral from another facility was the reason for admission for 18 patients and 193 were hospitalized from home. Complete CGA data sets were collected from 118 (50 males, 68 females) of the patients admitted from home.

CGA

For the CGA, we evaluated the basic activities of daily living (BADL), instrumental ADL (IADL), vision, hearing, and communication in the physical aspect, cognitive function and depression in the mental aspect, economic status, marital status, family status, relationship with family members, and ability to behave as a group in the social aspect.

BADL

The Barthel index was used to assess capability with BADL.[6] The total scores were divided between greater than or less than 16. In each item subjects were divided into two groups: the full mark and other.

IADL

The Lawton scale was used to assess IADL.[7] The total scores were divided between greater than or less than 4. In each item subjects were divided into two groups: the full mark and other.

Cognitive function

The mini-mental state examination (MMSE) was used to assess cognitive function.[8] The total scores were divided between greater than or less than 23. In each item subjects were divided into two groups: the full mark and other.

Depression

The Geriatric Depression Scale-15 was used to assess mood.[9] The total scores were divided between greater than or less than 5.

Physical functional assessment

Vision, hearing, communication ability, and ability to ascend and descend stairs were evaluated by scoring from 0 (unable) to 3 (able). In each item subjects were divided into two groups: the full mark and other.

Social status

Using scales developed by Ozawa[1] economic status, family status, relationship with family, and group behaviour ability were assessed. Higher scores indicate a better social life.

Statistical analysis

Statistical Analysis System (SAS) version 6.12 software was used for statistical analysis. Chi-squared analysis was performed in two groups: short LOS (≤ 27 days) and long LOS (≥ 28 days), followed by multiple logistic analysis. Fisher's exact probability test was used for comparing the binominal proportion from two independent samples in 2×2 tables with small expected counts (less than 5).

In all analysis, $P < 0.05$ was considered statistically significant.

Results

Table 1 shows the characteristics of the patients and the relation of LOS assessed by single variant analysis is shown in Table 2. Chi-squared analysis showed that the total scores of BADL, IADL, vision, economic status, and group behaviour were significantly associated with longer LOS. Four disease categories (diabetes mellitus, cerebrovascular disease, ischemic heart disease, and dementia) that were relatively prevalent in the ward were not significant factors in the same analysis (data not shown). Tables 3–6 show the relation between each item of the BADL, IADL and MMSE. Independence of all BADL items, except grooming, was significantly associated with longer LOS (Table 3). Independence of all IADL items, except telephone use and travel, was significantly associated with longer LOS (Table 4). In the

Table 1 Characteristics of the subjects admitted to a geriatric ward

Age	77.0 ± 7.2
M/F	50/68
Total score of BADL (mean ± SD)	17.2 ± 4.4
Total score of IADL (mean ± SD)	5.7 ± 2.4
Total score of MMSE (mean ± SD)	25.8 ± 4.7
LOS (mean ± SD) (days)	40.8 ± 30.5
No. of medications	6.4 ± 3.8
No. of diseases	3.4 ± 2.0

BADL, basic activities of daily living; IADL, instrumental ADL; LOS, length of hospital stay; MMSE, mini-mental state examination.

Table 2 Relationship between length of stay (LOS) and gender, age and items from the Comprehensive Geriatric Assessment (CGA)

Item	LOS		*P* value
	≤ 27 days	≥ 28 days	
Gender			
Male	22 (44.0%)	28 (56.0%)	NS
Female	32 (47.1%)	36 (52.9%)	
Age (years)			
≥ 80	33 (44.0%)	42 (56.0%)	NS
≤ 79	21 (48.8%)	22 (51.2%)	
Total BADL score			
≥ 16	49 (53.8%)	42 (46.2%)	< 0.001
≤ 15	5 (18.5%)	22 (81.5%)	
Total IADL score			
≥ 4	49 (51.0%)	47 (49.0%)	0.02
≤ 3	5 (22.7%)	17 (77.3%)	
Total MMSE acore			
≥ 23	45 (49.5%)	46 (50.5%)	NS
≤ 22	9 (33.3%)	18 (66.7%)	
GDS-15			
≥ 5	25 (51.0%)	24 (49.0%)	NS
≤ 4	29 (42.0%)	40 (58.0%)	
Vision			
Healthy	46 (51.1%)	44 (48.9%)	0.04
Impaired	8 (28.6%)	20 (71.4%)	
Hearing			
Healthy	39 (45.3%)	47 (54.7%)	NS
Impaired	15 (46.9%)	17 (53.1%)	
Communication			
Healthy	52 (48.1%)	56 (51.9%)	NS*
Not healthy	2 (20.0%)	8 (80.0%)	
Economic status			
Independent	54 (48.2%)	58 (51.8%)	0.03*
Dependent	0 (0.0%)	6 (100.0%)	
Marital status			
With spouse	25 (43.1%)	33 (56.9%)	NS
Without spouse	29 (48.3%)	31 (51.7%)	
Familial status			
Not alone	43 (44.8%)	53 (55.2%)	NS
Alone	11 (50.0%)	11 (50.0%)	
Familial relationships			
Intimate	28 (51.9%)	26 (48.1%)	NS
Not intimate	26 (41.3%)	37 (58.7%)	
Group behaviour			
Eager to join	41 (55.4%)	33 (44.6%)	0.006
Not eager to join	13 (29.5%)	31 (70.5%)	

*Fisher's exact probability test.

MMSE, only 'calculation' showed statistical significance (Table 5). Five types of multiple logistic analyses were performed (Table 6). In model 1, items in the BADL scales (Barthel index) that had *P* values less than 0.10 in the Chi-squared analysis were considered. Dressing showed a significantly high odds ratio. In model 2, items in the IADL (Lawton scale) that had *P* values less than 0.10 were considered. Dependence with laundry and