

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 time 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

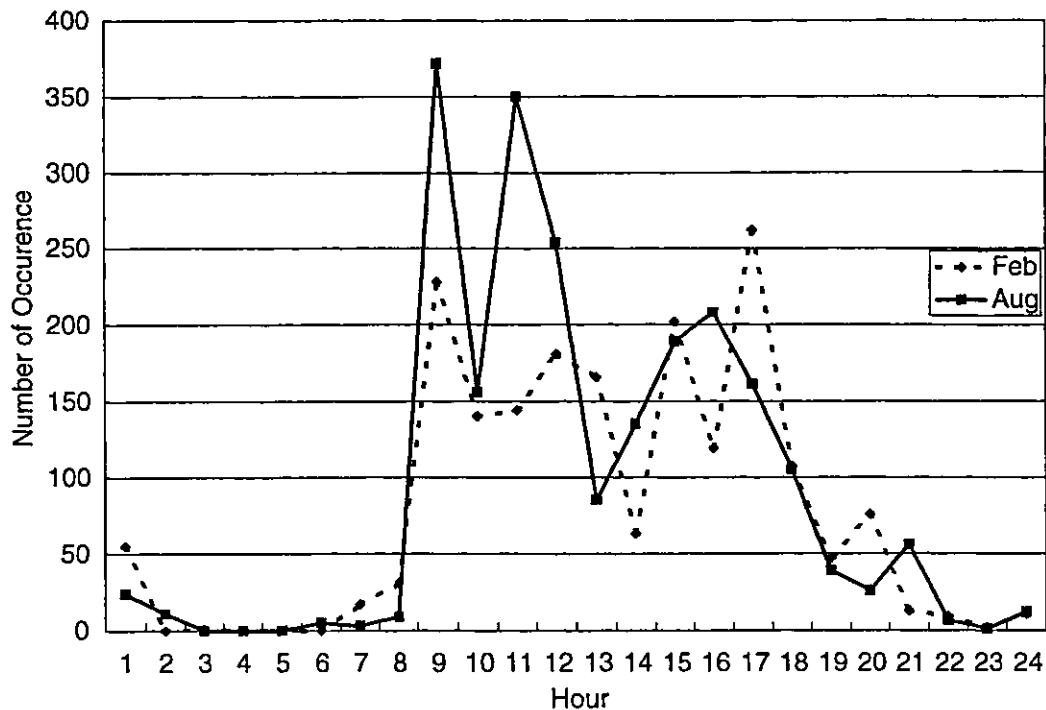


Fig. 2. Time of occurrence of communication/recording tasks. The number of occurrences was on the rise between February and August in the 8:00–9:00 and 10:00–11:00 time periods.

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		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		<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 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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