

A questionnaire survey of special old age nursing homes and elderly health care facilities in Japan

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ABSTRACT

We studied the conditions in special old age nursing homes and elderly health care facilities in Japan especially in a region with a cold climate. A questionnaire survey for all special old age nursing homes and elderly health care facilities in Sapporo and Fukuoka City, and Hokkaido, Saitama, Kanagawa, and Osaka Prefecture, and Tokyo Metropolis was performed. The main questionnaire asks about heating, air-cooling, ventilation systems, sanitary systems and indoor air quality including bio-aerosol and odours. We sent the questionnaire sheets, which were A-4 sized and running to four pages, to a total of 1479 homes and facilities. We received a total of 646 answers, about 44% of the total number. The 95 questionnaire items were converted into 249 categories for statistical analyses. The present database for special old age nursing homes and elderly health care facilities consists of about 160 000 bits of data. The data obtained from Sapporo City and Hokkaido Prefecture were compared with those of other regions. This paper describes the characteristics of special old age nursing homes and elderly health care facilities in a region with a cold climate. The main differences as compared to warmer regions were setting values of air temperature in both the winter and summer and the existence of an air-cooling system.

INDEX TERMS

Questionnaire survey; Old age; Nursing homes; Health care facilities

INTRODUCTION

In Japan, the number of people of advanced age is increasing. However, the actual hygiene conditions prevailing in present-day special old age nursing homes and elderly health care facilities are uncertain. Therefore, we performed a questionnaire survey for special old age nursing homes and elderly health care facilities in six main regions including Tokyo Metropolis. The main questionnaire asks about heating, air-cooling, the ventilation system, the sanitary system and indoor air quality including bio-aerosol and odours. The database consisted of about 160 000 bits of data. This paper describes the characteristics of special old age nursing homes and elderly health care facilities in a region with a cold climate.

METHODS

Outline of Questionnaire Survey

The subjects were special old age nursing homes and elderly health care facilities in Sapporo and Fukuoka City, and Hokkaido, Saitama, Kanagawa, and Osaka Prefecture, and Tokyo Metropolis,

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which are the representative regions in Japan. Table1 shows the main questionnaire items mainly concerning heating, air-cooling, ventilation systems, sanitary systems and indoor air quality including bio-aerosols and odours. We sent the questionnaire sheets, which were A-4 sized and four pages long, to a total of 1479 homes and facilities. We received a total of 646 answers, about 44% of the total number (see Tables 2 and 3).

Table 1 Outline of questionnaire survey

Main Item	Sub Item
Outline of Facility	Name; Place; Year; Floor Area; No. of Capacity; No. of Visitor;
Maintenance and Management	Keeping Blueprint of Facilities; Program for the Year; Keeping Record of Maintenance and Management;
Practice of Maintenance and Management	Measurement of Indoor Air–Air Temperature; Humidity; Air Velocity; CO; CO ₂ ; Particulate Aerosol and Dust Checking and Cleaning (Air Filter; Cooling Tower; Humidifier) Inspection of Drinking Water (Residual Chlorine; Odor; Taste; Color; Muddiness and Quality) Checking and Cleaning of Water Works (Water Tank; Water Supply System) Checking and Cleaning Sewerage (Drain and Sewer Pipe); Biannual through Cleaning Checking and Cleaning of Gathering and Transport and Disposal of Refuse; Control of Insect and Pests
Control of Air Temperature and Humidity	Mean Value of Air Temperature and Humidity–Summer; Winter; Spring and Autumn; Complaint for Hot and Cold Sensation its Detail–Summer; Winter; Spring and Autumn Problem of Maintenance and Management of Air Temperature; Problem of Maintenance and Management of Humidity
Counterplan of Odor	Odoriferous Place; Deodorization Method; Acceptance of Deodorization by Ozone
Complaint by Occupant	Frequency; Detail; Reason and Counterplan of Complaint (Air Conditioning; Water Supply; Swage; Cleaning; Insect & Pests and Others)
Problem of Maintenance and Management	Point at Issue; Reason and Counterplan (Air Conditioning; Water Supply; Swage; Cleaning; Insect & Pests and Others)
Comments	Free Description

Developing Database

The 95 questionnaire items as shown in Table1 were converted to 249 categories for statistical analyses. The database for special old age nursing homes and elderly health care facilities consisted of about 160 000 bits of data.

Table 2 Total number of subjects and replies

	No. of subject	No. of reply	reply [%]
Hokkaido	174	112	64.4
Saitama	257	66	25.7
Tokyo	426	138	32.4
Kanagawa	283	79	27.9
Osaka	291	220	75.6
Fukuoka	48	33	68.8
total	1479	648	43.8

Table 3 Number of subjects and replies in special old age nursing homes and elderly health care facilities

	Special nursing old age home			Elderly health care facilities		
	No. of subject	No. of reply	reply [%]	No. of subject	No. of reply	reply [%]
Hokkaido	37	37	100.0	137	75	54.7
Saitama	171	45	26.3	86	21	24.4
Tokyo	320	107	33.4	106	31	29.2
Kanagawa	185	55	29.7	98	24	24.5
Osaka	153	112	73.2	138	108	78.3
Fukuoka	26	17	65.4	22	16	72.7
total	892	373	41.8	587	275	46.8

RESULTS AND DISCUSSION

Age of the Building

There are 37 special old age nursing homes in Sapporo city, Hokkaido. The oldest one was built in 1965 and the newest one was built in 2001, the mean being 1989. On the other hand, the oldest elderly health care facility in Hokkaido was built in 1988 and the newest one was built in 2001, the mean being 1996. In general, special old age nursing homes were time-honoured compared with elderly health care facilities in Japan.

Floor Area and Capacity

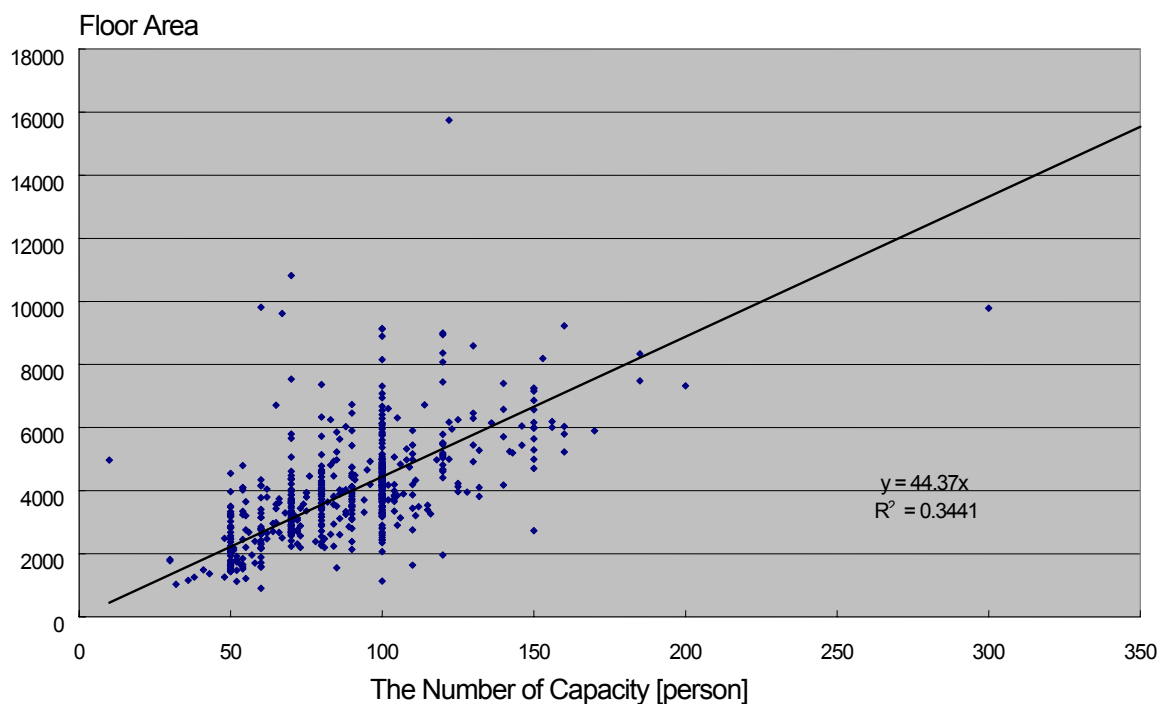
The floor area of special old age nursing homes in Sapporo ranged from 1612 m² to 15 749 m² and the mean value was 4648 m². The floor area of elderly health care facilities in Hokkaido ranged from 1483 m² to 7481 m² and the mean value was 4312 m², the same as in special old age nursing homes. The capacity of special old age nursing homes in Sapporo ranged from 50 to 200 and the mean value was about 95. The capacity of elderly health care facilities in Hokkaido ranged from 41 to 185 and the mean value was 90.8. The number of visitors (outpatients) to special old age nursing homes in Sapporo ranged from 2 to 150 and the mean value was 28.1 per day. The number of visitors to elderly health care facilities in Hokkaido ranged from 4 to 88 and the mean value was 30.4 per day. Tables 4 and 5 summarize the mean, the minimum and the maximum values of the floor area and the capacity, respectively. The floor area of all the 648 facilities ranged from 907 m² to 15 749 m². From Table 4, we see that the mean values of the floor area in Hokkaido and Tokyo Metropolis were relatively larger than in the other regions. The capacity of all the 648 facilities ranged from 30 to 380 persons and the mean value was 89. The mean value of the capacity in Saitama was smaller than that in the other regions. Figure 1 shows the relationship between the floor area and the capacity. The floor area was proportional to the capacity ($R = 0.587$). We find that, at present, the floor area per person in Japanese special old age nursing homes and elderly health care facilities was about 44 m².

Table 4 The mean, the minimum and the maximum values of floor area

	Floor area [m ²]		
	mean	min	max
Hokkaido	4423	1483	15749
Saitama	3721	1118	9813
Tokyo	4413	907	9617
Kanagawa	3696	1516	8940
Osaka	3696	1134	6542
Fukuoka	3796	1574	9786
total	4015	907	15749

Table 5 The mean, the minimum and the maximum values of the capacity

	No. of Capacity		
	mean	min	max
Hokkaido	92	41	200
Saitama	78	50	150
Tokyo	96	30	185
Kanagawa	90	36	160
Osaka	89	43	157
Fukuoka	99	30	380
total	89	30	380

**Figure 1** The relationship between the floor area and the capacity

Measurements of Air Temperature and Humidity

Table 6 shows when air temperature was measured in the various facilities. A total of 73% of special old age nursing homes and elderly health care facilities measured the air temperature; 52% of homes and facilities measured air temperature periodically. The percentage of facilities measuring air temperature in Hokkaido was 83%, which was relatively higher than those in the other regions. Measurements of relative humidity were done by a total of 63%. The percentage of facilities measuring relative humidity in Hokkaido was 74%, which was also relatively higher than those in the other regions.

Checking and Cleaning of Air Filter

Table 7 shows when the air filter was checked. A total of 96% of special old age nursing homes and elderly health care facilities checked air filters periodically and 86% of the homes and facilities checked air filters

periodically. The percentage of facilities checking the air filter in Hokkaido was 92%, which was relatively lower than those in the other regions. It was felt that this could be improved. A total of 98% of special old age nursing homes and elderly health care facilities cleaned air filters and 86% of the homes and facilities cleaned air filters periodically. The percentage of facilities cleaning air filters in Hokkaido was 93%, which was relatively lower than those in other regions and it was felt that this could be improved upon in Hokkaido district.

Table 6 The measurements of air temperature

[%]	Periodical	Temporary	Non	Unknown
Hokkaido	56	27	14	3
Saitama	44	20	34	2
Tokyo	58	12	28	2
Kanagawa	47	27	25	1
Osaka	55	20	23	2
Fukuoka	43	18	39	0
total	52	21	25	2

Table 7 The checking of the air filter

[%]	Periodical	Temporary	Non	Unknown
Hokkaido	76	16	6	2
Saitama	79	14	5	2
Tokyo	88	8	3	1
Kanagawa	89	7	4	0
Osaka	80	18	2	0
Fukuoka	82	15	3	0
total	82	14	3	1

Control of Air Temperature and Humidity

Table 8 summarizes the setting values of air temperature and humidity in each district and season. In summer the mean of setting values of air temperature was 25.2°C. The air temperature that was set in Fukuoka, the south part of Japan, was the highest value, namely 25.7°C. In winter, the mean value of the air temperature set was 23.7°C. The air temperature set in Hokkaido, the northern part of Japan, was the highest, namely 24.4°C. The air temperatures set in Saitama and Osaka were 23.2°C and 23.2°C, which were relatively lower values.

In summer, the mean value set for relative humidity was 53%. The values set for relative humidity in Hokkaido and Osaka were lower than those of the other districts. In winter, the mean value of the relative humidity was 41%. The value set for relative humidity in Hokkaido in winter was the lowest value, namely 38%.

Complaints by Occupants

Table 9 shows the complaints by occupants concerning cold, hot and dizzy sensations in each season. In winter, 43% complained about feeling cold. It was supposed to be caused by poor heating systems. In summer, there were complaints by occupants about feeling cold in 14–24% of the homes and facilities except in Hokkaido district. It seemed to be caused by over-cooling. On the other hand, complaints about feeling hot in winter were less. In summer, 44% complained about feeling hot. It was hoped that both heating and cooling systems would be optimized in Japan's elderly homes and facilities.

Table 8 The air temperature and humidity set in each season

	Summer		Winter		Spring/Autumn	
	Temperature	Humidity	Temperature	Humidity	Temperature	Humidity
	[°]	[%]	[°]	[%]	[°]	[%]
Hokkaido	25.3	51	24.4	38	24	45
Saitama	25.2	56	23.2	42	23.6	49
Tokyo	25.5	54	23.4	40	24	47
Kanagawa	25.1	54	23.9	42	23.9	48
Osaka	25.1	50	23.1	41	23.6	45
Fukuoka	25.7	52	23.7	41	24.2	47

Table 9 Complaints by occupants in each season

	Cold sensation			Hot sensation			Dizzy sensation		
[%]	Summer	Winter	Spring/Autumn	Summer	Winter	Spring/Autumn	Summer	Winter	Spring/Autumn
Hokkaido	4	44	32	40	15	10	5	2	1
Saitama	23	40	12	42	9	9	0	0	0
Tokyo	14	37	21	38	13	20	3	4	2
Kanagawa	23	44	13	38	9	16	4	4	1
Osaka	24	46	24	48	11	18	2	6	1
Fukuoka	24	52	21	45	9	21	9	0	0
total	18	43	22	43	11	16	3	4	1

CONCLUSIONS

- We intended to verify the present status of special old age nursing homes and elderly health care facilities in Japan especially in a cold region. A questionnaire survey for all special old age nursing homes and elderly health care facilities in Sapporo and Fukuoka City, and Hokkaido, Saitama, Kanagawa, and Osaka Prefecture, and Tokyo Metropolis was performed.
- The main questionnaire asks about heating, air-cooling, ventilation systems, sanitary systems and indoor air quality including bio-aerosols and odours. We sent the questionnaire sheets to a total of 1479 homes and facilities. We received a total of 646 answers, about 44% of the total number. The 95 questionnaire items were converted into 249 categories for statistical analyses. The present database for special old age nursing homes and elderly health care facilities consists of about 160 000 pieces of data.
- The data obtained from Sapporo City and Hokkaido Prefecture were compared with those of the other regions especially with regard to the following: the age of the building, the floor area, building capacity, air temperature, humidity, maintenance of air filter and complaints by occupants. The main differences were in the setting of values of air temperature in both winter and summer and in the air-cooling systems.

ACKNOWLEDGEMENTS

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