

## Healthy Housing as an Infrastructure of Health Support System

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### Abstract

In order to evaluate the importance of housing program for the healthy aged society, we have conducted a situation analysis of housing condition of the aged living in a city of Fukuoka Prefecture. The data was collected from 2,611 elderly people living in a city of Fukuoka prefecture. At first, the necessity of reconstruction was cross-evaluated by sex, age, type of household, health status, ADL independency level, type of residence. Then factors associated with willingness to use the institutional care were analyzed by the logistic regression analysis. The present results clarified that the aged living in the houses with necessity of reconstruction have showed more willingness to use institutional services that are covered by the public medical insurance and LTCI. Historically, the housing policy has long been separated from the public health policy in Japan. It is strongly recommended to integrate the housing policy into the public health policy in order to realize a healthy aged society.

Key words: Healthy housing, home care, institutional care, the aged, Japan

### ❖ Introduction

The very rapid ageing is on going in Japan. Table 1 shows the chronological changes of demographic structure<sup>1)</sup>. It is estimated that there will be 1.7 million deaths in 2038<sup>2)</sup>. In 2003, 78.3% of deaths occurred at hospital and 13.0% were at home<sup>3)</sup>. Apparently, it will become impossible to deliver enough volume of terminal care only at hospital. Faced with the rapid ageing of society, it becomes an urgent task to prepare a well organized home care system in Japan.

In order to promote home care, the Japanese government introduced the Long Term Care Insurance (LTCI) in 2000. In 2000, 600,000 aged were institutionalized, and 1,240,000 aged received home-based ADL care services on monthly basis<sup>4)</sup>. On monetary base, these figures correspond to 194.0 billion yen

(1.94 billion USD; 100 yen = 1 USD) to institutional care and 99.6 billion yen (1.00 billion USD) to home-based care in each month. Six years later, in 2006, the monthly average number of aged persons who received institutional care and home-based care increased up to 810,000 and 2,570,000, respectively. On monetary base, these figures correspond to 206.3 billion yen (2.06 billion USD; 100 yen = 1 USD) for institutional care and 228.9 billion yen (2.29 billion USD) for home-based care. Even though the home care has been much advanced, the government considers there is still a room for promotion of home care.

In the 2006 Health Care Reform Plan, the government clarified its will to further promote the home care. The Ministry of Health, Labour and Welfare (MHLW) has largely decreased the tariff for long-term care beds intending to decrease a large number of this type of beds within the coming 5 years. Decreased beds are recommended to be transformed to a new type of residence for the aged; such as assisted living and nursing home. These types of facilities do not require higher staffing, thus do cost less both for delivery side and insurers. In order to facilitate this reorganization

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Table 1 Chronological changes in the age structures

	Total	Age category		
		0-14	15-64	65-
1950	84,114,574 100.0%	29,786,412 35.4%	50,168,312 59.6%	4,155,180 4.9%
1960	94,301,623 100.0%	28,434,159 30.2%	60,469,355 64.1%	5,397,980 5.7%
1970	104,665,171 100.0%	25,152,779 24.0%	72,119,100 68.9%	7,393,292 7.1%
1980	117,060,396 100.0%	27,507,078 23.5%	78,834,599 67.3%	10,647,356 9.1%
1990	123,611,167 100.0%	22,486,239 18.2%	85,903,976 69.5%	14,894,595 12.0%
2000	126,925,843 100.0%	18,472,499 14.6%	86,219,631 67.9%	22,005,152 17.3%
2005	127,767,994 100.0%	17,521,234 13.7%	84,092,414 65.8%	25,672,005 20.1%

of service delivery system, the government prepares a special loan with very low interest rate for them.

But it will be rather difficult to succeed unless they prepare supportive environment for the promotion of home care of the frail elderly. As our previous results indicated<sup>5)</sup>, a considerable number of frail elderly prefer to stay at hospitals because they regard the hospital as a safety and comfortable residence. This finding suggests that it must be required to prepare the safe and healthy housing for the aged in order to promote home care.

In order to evaluate the importance of housing program for the healthy aged society, we have conducted a situation analysis of housing condition of the aged living in a city of Fukuoka Prefecture.

## ❖ Studied Population and Method

### Studied population

The population studied was inhabitants of a city of Fukuoka prefecture. The 2,677 inhabitants more than 65 years old were randomly selected from citizen registration by the city council. Among them we have used data of 2611 peoples with sufficient information about residence for the analysis. There are no significant differences between the included and excluded persons for the distribution of age, sex, ADL dependency level.

### Method

The trained interviewers visited to chosen inhabitants and gathered information using a structured questionnaire from June to September 2003. The questionnaire composes of items regarding demographic data (sex, age, address, household's type), health status, ADL and IADL, type of residence (apartment house or detached, private or public), necessity of reconstruction of residence, and willingness to use institutional services covered by medical insurance or LTCI (long-term care wards, medical nursing home, and nursing home). The name of studied people was excluded from the data by the city office in order to assure the privacy.

At first the necessity of reconstruction was cross-evaluated by sex, age, type of household, health status, ADL independency level, type of residence. Then factors associated with willingness to use the institutional care were analyzed by the logistic regression analysis.

For evaluation of ADL and IADL, the TAI (Typology of Aged with Illustration) was used<sup>6)</sup>.

The statistical analyses were conducted by SPSS 15.0J.

## ❖ Results

Table 2 shows the general characteristics of stud-

Table 2 General characteristics of studied aged peoples

Age category			Necessity of reconstruction of residence		
	N	%		N	%
65–74 years old	1597	60.0	No	2180	81.9
75 years old and more	1064	40.0	Yes	481	18.1
Sex			Necessity of reconstruction for entrance		
	N	%		N	%
Female	1549	58.2	No	2570	96.6
Male	1112	41.8	Yes	91	3.4
TAI for mobility			Necessity of reconstruction for bathroom		
	N	%		N	%
0	7	0.3	No	2395	90.0
1	11	0.4	Yes	266	10.0
2	16	0.6	Necessity of reconstruction for toilet		
3	124	4.7		N	%
4	320	12.0	No	2448	92.0
5	2183	82.0	Yes	213	8.0
TAI for eating			Necessity of reconstruction for hallway		
	N	%		N	%
0	6	0.2	No	2510	94.3
2	4	0.2	Yes	151	5.7
3	12	0.5	Necessity of reconstruction for living room		
4	44	1.7		N	%
5	2595	97.5	No	2604	97.9
TAI for toileting			Yes	57	2.1
	N	%	Type of residence		
0	6	0.2		N	%
1	2	0.1	Single house	2547	95.7
2	14	0.5	Group house	114	4.3
3	22	0.8	Type of household		
4	70	2.6		N	%
5	2547	95.7	Extended family	1191	44.8
TAI for bathing			Aged couple	1089	40.9
	N	%	Single	381	14.3
0	6	0.2	Ownership of residence		
1	10	0.4		N	%
2	21	0.8	Own house	2492	93.6
3	45	1.7	Rent house	44	1.7
4	141	5.3	Public house	92	3.5
5	2438	91.6	Others	33	1.2
TAI for house affairs			Oldness of residence		
	N	%		N	%
0	33	1.2	–5 years	153	5.7
1	375	14.1	6–20 years	562	21.1
2	60	2.3	21–30 years	993	37.3
3	360	13.5	31 years –	928	34.9
4	217	8.2	Unknown	25	0.9
5	1616	60.7	Past or present history of CVA		
Past or present history of CVA				N	%
	N	%	No	2482	93.3
No	2482	93.3	Yes	179	6.7
Yes	179	6.7	Present history of OMD		
Present history of OMD				N	%
	N	%	No	2135	80.2
No	2135	80.2	Yes	526	19.8
Yes	526	19.8			

TAI: Typology of Aged with Illustration  
 CVA: Cerebro-vascular diseases  
 OMD: Osteo-muscular diseases

Table 3 Relationship between type of residence ownership and necessity of reconstruction

Type of ownership		Necessity of reconstruction		Total
		Yes	No	
One own house	N	2039	453	2492
	%	81.8	18.2	100.0
Rented Housing	N	44	0	44
	%	100.0	0.0	100.0
Public Housing	N	67	25	92
	%	72.8	27.2	100.0
Others	N	30	3	33
	%	90.9	9.1	100.0
Total	N	2180	481	2661
	%	81.9	18.1	100.0

Chi square test:  $p < 0.01$ .

Table 4 Relationship between type of household and necessity of reconstruction

Type of household		Necessity of reconstruction		Total
		Yes	No	
Extended family	N	973	218	1191
	%	81.7	18.3	100.0
Aged couple	N	881	208	1089
	%	80.9	19.1	100.0
Single	N	326	55	381
	%	85.6	14.4	100.0
Total	N	2180	481	2661
	%	81.9	18.1	100.0

Chi square test:  $p = 0.12$ .

ied peoples. The mean age was 73.8 (SD: 6.4) and 40% were over 75 years old. Female occupied 58.2%. So far as ADL independency is concerning, 80% were independent for mobility, 60% for house affairs, and more than 90% for eating, toileting and bathing. Past or present history of cerebro-vascular diseases were observed for 6.7% and present history of osteo-muscular diseases were for 19.8%. Eighteen percent of investigated persons indicated the necessity of reconstruction of their residence. The most frequent place that required reconstruction was bathroom (10.0%) followed by toilet (8.0%), hallway (5.7%), entrance (3.4%) and living room (2.1%).

Table 3 shows the relationship between type of residence ownership and necessity of reconstruction. Interestingly, persons in public housing indicated more the necessity of reconstruction with statistical significance ( $p < 0.01$ , chi square test).

Table 4 shows the relationship between type of household and necessity of reconstruction. Although the aged of single household showed a slightly higher response for necessity of reconstruction, there was no statistically significant relationship between the two variables.

Table 5 shows the relationship between type of residence ownership and type of household. The aged

Table 5 Relationship between type of household ownership and type of household

Type of household		Type of ownership				Total
		One's own house	Rented housing	Public housing	Others	
Extended family	N	1159	15	10	7	1191
	%	97.3	1.3	0.8	0.6	100.0
Aged couple	N	1040	12	35	2	1089
	%	95.5	1.1	3.2	0.2	100.0
Single	N	293	17	47	24	381
	%	76.9	4.5	12.3	6.3	100.0
Total	N	2492	44	92	33	2661
	%	93.6	1.7	3.5	1.2	100.0

Chi square test:  $p < 0.01$ .

Table 6 Analysis concerning factors associated with the willingness to use institutional services (Logistic regression analysis)

	Beta	SD	Wald	p-value	OR	95% CI of OR	
age_cat	0.059	0.086	0.463	0.496	1.061	0.895	1.256
SEX	-0.112	0.099	1.264	0.261	0.894	0.736	1.087
CVA	-0.138	0.168	0.675	0.411	0.871	0.626	1.211
OMD	0.132	0.105	1.593	0.207	1.141	0.930	1.401
Mobility	0.156	0.078	4.030	0.045	1.169	1.004	1.361
House affairs	0.005	0.035	0.018	0.893	1.005	0.939	1.075
Reconstruction	0.261	0.103	6.414	0.011	1.298	1.061	1.588
Dummy for single	0.442	0.123	12.939	0.000	1.555	1.223	1.978
Dummy for aged couple	0.216	0.088	5.958	0.015	1.241	1.043	1.476
Constant	-1.303	0.357	13.299	0.000	0.272	0.135	0.547

Dependent variable: Wish to use institutional services covered by medical insurance or LTCI

Yes = 1, No = 0

Independent variables: age\_cat age category: 65 to 74 = 0, 75 and more = 1

Sex: male = 0, female = 1

CVA Past or present history of Cerebro-vascular disease: no = 0, yes = 1

OMD Present history of Osteo-muscular diseases: no = 0, yes = 1

Mobility Independency for mobility measured by TAI: lowest = 0, highest = 5

House affaires Independency for house affaires measured by TAI: lowest = 0, highest = 5

Reconstruction Necessity of reconstruction of residence: no = 0, yes = 1

Dummy for single: no single household = 0, single household = 1

Dummy for aged couple: no aged couple household = 0, aged couple household = 1

of single household lived in the public housing more than other types of household with statistical significance ( $p < 0.01$ ).

Table 6 shows the results of logistic regression analysis concerning factors associated with the willingness to use institutional services covered by the public medical insurance and LTCI. Statistically sig-

nificant higher odds ratios of willingness to use were observed for independency of mobility (OR = 1.169, 95% of CI = 1.004 – 1.361), necessity of reconstruction (OR = 1.298, 95% of CI = 1.061 – 1.588), single household (OR = 1.555, 95% of CI = 1.223 – 1.978), and aged couple household (OR = 1.241, 95% of CI = 1.043 – 1.476).

## ❖ Discussion

Our results clarified that the aged living in the houses with necessity of reconstruction have showed more willingness to use institutional services that are covered by the public medical insurance and LTCI. The Japanese generous health insurance scheme covers most of institutional fee (only 10% of co-payment for the aged). So that to live in hospital is a cheaper, safer and thus reasonable choice for the frail aged. In the case of single female aged, it is very often the case that they can receive only the lowest level of pension because most of them do not receive the additional pension by occupational settings<sup>7)</sup>. As our previous study has indicated<sup>5)</sup>, the frail aged prefers to stay in hospital as long as possible, because a hospital becomes a kind of comfortable and safe residence for them. This explanation fits well why the aged categorized as single or aged couple household showed more inclination to use the institutional services in the present study.

This type of hospitalization has long been criticized as the hospitalization with social reason. The MHLW estimates that at least one third of long hospitalized aged patients might be such cases. The hospitalization with social reasons cost expensive for the society even though it would be a rational and reasonable choice for the individual aged.

In order to solve this problem, the MHLW has launched the 2006 Health Care Reform Plan in which they put much importance on the development of home care. The MHLW has clarified their will to transform one third of long term care beds into nursing homes and assisted livings. However, under the actual situation, most of the users do not welcome such a program, because it will transfer the financial, psychological and physical burden to the aged and their family. In order to solve this problem, it is absolutely necessary to assure the comfort and safety at home. Hayakawa reported that many aged people in the lower socio-economic class were obliged to live in old and narrow-spaced houses<sup>8)</sup>. He also reported that the aged peoples were often denied to borrow a house because of their age and health problems. This is one of the reasons why the Japanese aged prefer to stay in hospital even though the medical problem does not require it.

It must be beard in mind that the current difficult situation has been partly caused by the poor housing

policy of our country. In most of the developed countries, such as UK and France, the development of residence has been organized as a part of social security policy.

On the contrary, the Japanese government has long depended on the private initiative for the construction of residence. During the highly economic development era, the preparation of residence for workers and their family was an important fringe benefit of welfare services organized by company. Furthermore, workers were recommended to do saving in order to construct their own house. The company prepared a variety of supportive services, such as a saving account with higher interest rate and a special loan with low interest rate. During this historical process, the public housing tended to be for the relatively lower economic classes. Furthermore, the public housing had characteristics of “temporary residence” and inhabitants were expected to quit the public housing after they become afford to obtain their own private residence. Thus most of the public housing have not paid enough attention to the vulnerable groups such as the aged and handicapped. The present result also showed that the aged living in the public housing responded the necessity of reconstruction the most frequently. It is very important to recognize that the single household aged live dominantly in the public housing.

The above explanation indicated that the Japanese poor housing policy for the vulnerable groups is one of the most important reasons for overuse of institutional services. In order to ameliorate the quality of life of such aged and at the same time to rationalize the expenditures for medical and ADL care services, the government is required to implement the appropriate housing program for the vulnerable groups. Initially, such a program cost to some extent, but it will save the money for the social security system in the long run.

As Hayakawa has indicated, the healthy housing is a fundamental of public health policy<sup>8)</sup>. After the great works by Snow and Chadwick, the healthy housing has long been a part of public health policy in UK<sup>9)</sup>. The WHO/Europe focuses the housing program at the WHO Centre for Environment and Health (Bonn office). Currently they address the following priority issues<sup>10)</sup>:

home safety and accidents  
indoor air quality

thermal comfort and energy  
residential environments and physical activity  
effects on mental health  
the challenge of ageing populations

Unfortunately, the housing policy has long been separated from the public health policy in Japan, and as a result, the healthy housing policy is not included in the Healthy Japan 21 plan.

Appropriate housing protects the inhabitants from heat, cold, damp, hazardous pollutants and other risk factors for health<sup>9)</sup>. As the 2003 summer scandal in France indicated<sup>Note</sup>, poor housing affects the vulnerable groups most. It is strongly recommended to integrate the housing policy into the public health policy in order to realize a healthy aged society.

### ❖ Note

The 2003 European heat wave was one of the hottest summers on record in Europe. The heat wave killed 14,802 French people, mostly elderly. Most homes of them and retirement homes were not equipped with air conditioning.

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