A Study on the relationships of Elderly Peoples' Residential Needs and Activities of Daily Living (ADL)

Hwang Kee-Ah, Dong-A university

I. INTRODUCTION

In Korea, the ratio of elderly peoples' homeownership is much higher than the average of the whole residents. However, the quality of the aged residence is lower. Thus they have desires for more healthy and accommodating residential environment(Lee, et al., 1990).

In designing houses for aged people it must be considered that as they get older, their overall physical and mental capabilities decline, thus reducing their ability to perform activities of daily living (ADL) considerably. Therefore, their residential needs in relation to ADL should be taken into account in planning the interior design.

This study was intended to analyze elderly households' residential needs based on the ADL assessment in order to provide with detailed data and guideline for future reference by planners of housing design for the aged. The objectives of this study were as follows:

First, to measure the ADL indices of elderly people.

Second, to examine the differences of ADL indices caused by individual background variables.

Third, to find out elderly people's major residential needs for housing design.

Forth, to examine differences of residential needs according to their ADL indices.

II. THEORETICAL REVIEW

For several years, the ratio of independent senior householder has steadily increased. This phenomenon appears not to be a passing one, and it is understanded as one of household forms(Valins, 1988; Weal, 1988).

Given seniors' restricted life area, their residential environment is important for daily living. The house, as primary living place, is the thing that act on wellbeing (Montgomery,1972 ; Golant, 1982; Dakaki, 1993; Sung, 1994).

The International Association of Gerontology define the senior citizen as the person who show the symptoms of senility. As the definition, we can say these people who have following characteristics are the aged : having trouble in adapting the environmental changes properly, showing the failing of physical organs, tissues and vital functions, having mental defects in adjusting the livelihood and being on

the decline of storing their memories(Kim, 1997). Ultimately, the elderly are people who experience the difficulty of their own maintenance and weakening of social parts because of psychological fluctuations as well as physical and mental ability's decline.

Accordingly, as old people's physical and mental ability weaken, their living areas can be decreased and they are apt to stay in home or its surroundings. The importance of designing houses, hence, is increasing with the view of seniors' residential environment. If the aged can establish the houses and live in the places, which are designed thinking over the point of their convenience, they are provided with created environment which supplement for failing of activities of daily living. When planning the residental place for senior citizens, people must consider that the aged show the declining of ADL and body and soul ability.

ADL (Activities of Daily Living) indicate person's all activities that one need for daily living. There are, for instances, wearing clothes, eating food, buying products, making up face and etc. In other words, the meaning of ADL is just general term of human's behavior that can be seen in each individual life and that one needs for acting in home and society as a member both of them. It is very important indication for measuring the senior citizens' physical and mental conditions or abilities and it is very important element to perceive degree of their lives. As additional indications, there are PADL (Physical Activities of Daily Living) and IADL (Institutional Activities of Daily Living). PADL is a method for measuring the degree of their physical ability and IADL is a method for measuring the degree of their self-reliance rather than physical ability.

This study adopt the indication of Nomura's ADL (Ability of Daily Life) which classifies the symptoms of aging into physical functions, sensory functions, physiological functions, psychological characteristics, and life styles. As well, this study use Dakaki's house design guidelines as housing environmetal index which divide the standards into 8 areas: site environment, porch, hallway, stairway, kitchen, bathroom, bedroom and facilities.

III. METHOD AND PROCEDURE

1. Survey

The respondents were senior citizens aged 60 and over in Pusan city, who were able to live independently. Trained surveyors read questionnaires to them and had seniors themselves mark on answers pertaining to their cases. The data for this study were collected from 193 questionnaires between 23th of Jun. to 30th of Oct., 1998 by simple random sampling.

2. Tools and method employed

This study conducted a preliminary survey based on ADL developed by H.

Nomura and Housing Design Guidelines developed by K.Dakaki and adapted them to meet the objectives of this research. The questionnaire had a total of 89 questions including questions regarding ADL's(29 items), housing design guideline(40items) and individual background characteristics. We processed the gathered data using the SPSS PC to get the results of frequency, percentage, mean and standard deviation, χ^2-test, t-test, correlation and multiple regression.

IV. RESULTS AND INTERPRETATION

1. Sample characteristics

The explanation of the sample is presented in Table 1.

Table 1. Sample characteristics

N=193

Variables		f	%	Variables		f	%
Sex	male	44	22.8	Type of family	with the oldest son's family	51	26.4
	female	149	77.2		with the other son's family	33	17.1
Age	less than 65	107	55.4		with unmarried son and daughter	47	24.4
	- 70	48	24.9		alone/couple	62	32.1
	- 75	25	13.0	Preparation of senescence	have been prepared	88	45.6
	76 and over	13	6.7		maybe later	27	14.0
Occupation	employed	33	17.1		can't afford to do	67	34.7
	unemployed	160	82.9		other	11	5.7
Education	elementary school and under	90	46.6	Housing tenure	homeowner	148	76.7
	junior high/high school	79	41.0		renter	43	22.3
	2-year-college and over	24	12.4		other	2	1.0
Family income	less than ₩500,000	57	29.5	Type of house	detached house	102	52.8
	- ₩1,000,000	50	25.9		low-rise apartment	24	12.4
	- ₩2,000,000	53	27.5		high-rise apartment	48	24.9
	- ₩3,000,000	22	11.4		tenement house	14	7.3
	over ₩3,000,000	11	5.7		villa	5	2.6
Spouse	with	107	55.4	years of residence	less than 5	71	36.8
	without	86	44.6		- 10	48	24.9
Family size	1	28	14.5		- 15	16	8.3
	2	38	19.7		- 20	18	9.3
	3 ~ 4	74	38.3		- 30	21	10.9
	5 and over	53	27.5		31and over	19	9.8

2. ADL indices of respondents

To understand the physical and psychological characteristics of elderly people, we measured their ADL indices using Likert scales (1-5) over the five categories - sensory functions, physiological functions, physical functions, psychological characteristics, and life styles - . Higher ADL index indicates deterioration of physical or mental capability.

1) ADL

The mean of ADL indices for the five respective categories were as follows: physical (3.58), psychological (3.55), life style (3.45), physiological (3.43), and sensory (3.01).

Sensory functions deteriorated the least. Visual impairment was the most conspicuous of the sensory function entries (3.86). Olfactory, thermal, tactile senses were fine. "Sleep disturbance and insufficient sleep" was the most common physiological problem (3.79). Physical functions were shown to have deteriorated much. Bone, teeth, muscle and intestinal function deteriorated the worst. Psychological and life style problems included fear of relocation (3.88), nostalgia for old days (3.80), adaptation difficulty (3.74), attachment to old memories and social relationship (3.86). etc. The total ADL mean was 3.45(Table 2).

The results above reflect the typical characteristics of senescence, which should be taken into account in designing housing for elderly households. Also, special consideration would be required regarding their physical handicaps.

2) ADL index differences according to individual background variables

X^2 test revealed statistically significant differences in ADL indices according to gender, whether or not one has occupation and/or spouse, and the degree of preparedness for senescence. 'Female', 'unemployed', 'without spouse' and either 'prepared' or 'can't afford' groups showed higher ADL indices than counter group of each variable did(Table 3).

Nomura and Housing Design Guidelines developed by K.Dakaki and adapted them to meet the objectives of this research. The questionnaire had a total of 89 questions including questions regarding ADL's(29 items), housing design guideline(40items) and individual background characteristics. We processed the gathered data using the SPSS PC to get the results of frequency, percentage, mean and standard deviation, χ^2-test, t-test, correlation and multiple regression.

IV. RESULTS AND INTERPRETATION

1. Sample characteristics

The explanation of the sample is presented in Table 1.

Table 1. Sample characteristics

N=193

Variables		f	%	Variables		f	%
Sex	male	44	22.8	Type of family	with the oldest son's family	51	26.4
	female	149	77.2		with the other son's family	33	17.1
Age	less than 65	107	55.4		with unmarried son and daughter	47	24.4
	- 70	48	24.9		alone/couple	62	32.1
	- 75	25	13.0	Preparation of senescence	have been prepared	88	45.6
	76 and over	13	6.7		maybe later	27	14.0
Occupation	employed	33	17.1		can't afford to do	67	34.7
	unemployed	160	82.9		other	11	5.7
Education	elementary school and under	90	46.6	Housing tenure	homeowner	148	76.7
	junior high/high school	79	41.0		renter	43	22.3
	2-year-college and over	24	12.4		other	2	1.0
Family income	less than ₩500,000	57	29.5	Type of house	detached house	102	52.8
	- ₩1,000,000	50	25.9		low-rise apartment	24	12.4
	- ₩2,000,000	53	27.5		high-rise apartment	48	24.9
	- ₩3,000,000	22	11.4		tenement house	14	7.3
	over ₩3,000,000	11	5.7		villa	5	2.6
Spouse	with	107	55.4	years of residence	less than 5	71	36.8
	without	86	44.6		- 10	48	24.9
Family size	1	28	14.5		- 15	16	8.3
	2	38	19.7		- 20	18	9.3
	3 ~ 4	74	38.3		- 30	21	10.9
	5 and over	53	27.5		31and over	19	9.8

2. ADL indices of respondents

To understand the physical and psychological characteristics of elderly people, we measured their ADL indices using Likert scales (1-5) over the five categories - sensory functions, physiological functions, physical functions, psychological characteristics, and life styles - . Higher ADL index indicates deterioration of physical or mental capability.

1) ADL

The mean of ADL indices for the five respective categories were as follows: physical (3.58), psychological (3.55), life style (3.45), physiological (3.43), and sensory (3.01).

Sensory functions deteriorated the least. Visual impairment was the most conspicuous of the sensory function entries (3.86). Olfactory, thermal, tactile senses were fine. "Sleep disturbance and insufficient sleep" was the most common physiological problem (3.79). Physical functions were shown to have deteriorated much. Bone, teeth, muscle and intestinal function deteriorated the worst. Psychological and life style problems included fear of relocation (3.88), nostalgia for old days (3.80), adaptation difficulty (3.74), attachment to old memories and social relationship (3.86). etc. The total ADL mean was 3.45(Table 2).

The results above reflect the typical characteristics of senescence, which should be taken into account in designing housing for elderly households. Also, special consideration would be required regarding their physical handicaps.

2) ADL index differences according to individual background variables

X^2 test revealed statistically significant differences in ADL indices according to gender, whether or not one has occupation and/or spouse, and the degree of preparedness for senescence. 'Female', 'unemployed', 'without spouse' and either 'prepared' or 'can't afford' groups showed higher ADL indices than counter group of each variable did(Table 3).

Table 2. ADL assessment results of respondents[a)]

	ADL List	M	SD
Sensory functions	visual impairment	3.86	.85
	hearing loss	3.28	1.08
	olfactory impairment	2.56	1.21
	weakness of thermal sense	2.42	.93
	tactile dullness	2.95	1.01
	total	3.01	.69
Physilogical functions	sleep disturbance	3.79	.99
	frequent defecation	2.90	1.05
	overall deterioration of physiologic function	3.60	.90
	total	3.43	.68
Physical functions	general frailty	3.44	.88
	withered body	3.27	.99
	weakness of leg, ankle	3.62	.85
	short stride	3.37	.90
	mobility difficulty	3.54	.85
	weakness of arm, wrist	3.62	.84
	slow movement	3.80	.72
	easy to be tired	3.59	.83
	skeletal and muscular weakness	3.76	.76
	dyspepsia	3.79	.86
	total	3.58	.57
Psychological functions	longing for old days	3.80	.85
	adaptation problem	3.71	.77
	reluctance about changing their life style	3.74	.77
	fear of relocation	3.88	1.01
	thinking disturbance	2.81	.96
	emotional unstableness	3.37	.94
	limited interests	3.51	.80
	total	3.55	.52
Life style	have more spare time	3.45	.97
	stay more time at home	3.49	.89
	nostalgia for old day	3.86	.82
	social isolation	3.39	.93
	total	3.55	.55
TOTAL		**3.45**	**.41**

a) 5-point Likert Type scale

Table 3. ADL Index by Individual Background Variables

N=193

		ADL Index		total	χ^2
		high(98~145)	low(49~97)	(100.0)	
Sex	male	16(36.4)	28(63.6)	44	10.64***
	female	101(67.8)	48(32.2)	149	
Occupation	employed	14(42.4)	19(57.6)	33	4.49*
	unemployed	103(64.4)	57(35.6)	160	
Spouse	with	57(53.3)	50(46.7)	107	4.94*
	without	61(70.9)	25(29.1)	86	
Preparation of senescence	have been prepared	54(61.4)	34(38.6)	88	9.82*
	maybe later	10(37.0)	17(63.0)	27	
	can't afford to do	42(63.7)	25(37.3)	67	
	other	11(100.0)	-	11	

* P< .05 , *** P< .001

3. Residential needs

In order to know the elderly people's major residential needs, we showed them housing design guideline and measured their needs in Likert scale (1-5). We conducted a t-test[1)] to examine the differences of residental needs according to the ADL indices (Table 4).

Overall degree of need was high (mean: 3.72). The respective degree of need for the eight areas was in the following order: hallway (4.07), site (3.98), porch (3.93), stairway (3.89), kitchen (3.69), bedroom (3.51), bathroom (3.48), and facilities (3.28). In every item, the higher the ADL index, the higher the degree of need.

1) Site environment

The highest need about site environment was sufficient supply of sunshine (4.31), followed by slip-resistant floor (4.24), green zone (4.07), outdoor lightning (4.05), warehouse (3.90), backyard/ green (3.84) and entrance free of stairways and floor level changes (3.73). Such items as <stairways/ floor level changes>, <slip-resistant floor>, and <outdoor lightning> showed statistically significant differences according to ADL index.

2) Porch, hallway and stairway.

In case of porch, easy-to-handle door knob (4.14), adequate clear width (4.03), flat or slow-grade floor (3.99) and emergency/ security alarm (3.99) were items of higher priority. The degree of need for the emergency alarm in the porch was higher than in bathroom or bedroom, showing their concern over a possible accident. Such items as <flat floor>, <wheelchair accessibility>, <emergency alarm> and <grab bar> showed statistically significant disparities according to ADL index.

1) 5-point Likert Type Scale.

Regarding stairways, attention to the safety and accessibility of elderly people, especially those with mobility difficulty, is required:; <low risers, slow grade> (4.08), <illuminated nosing> (4.05). Every item in both hallway and stairway showed statistically significant differences according to ADL index.

3) Kitchen

Senescence accompanies respiratory troubles among others. Therefore good ventilation (4.10) as well as safety and convenience (3.89) is very important in the kitchen of elderly housing. Every item showed statistically significant differences according to ADL index.

4) Bathroom

The overall degree of need for bathroom was relatively low compared with otherareas. However. slip-resistant floor (4.25) is very important to prevent slip-and-fall accidents. Comparatively of higher importance among other items were auxiliary heating (3.69), grab bar/ handrail on the wall (3.58) and bathtub safety bar (3.44). Installation of non-skid mat or floor surface and grab bars would be required to guarantee safe and easy transfer. Such items as <wheelchair accessible entrance>, <slip-resistant floor>, <grab bars> (wall-/ door-/ bathtub-mounted), <heating> and <emergency device> showed statistically significant differences according to ADL index.

5) Bedroom

Most of elderly people want their bedroom southward-exposed (4.12). Such items as <wheelchair accessible entrance>, <affiliated bathroom> and <emergency device> showed statistically significant differences according to ADL index.

6) Facilities

The demand for emergency device was high (3.82), whereas the demand for elevator or platform lift was low (2.75). Both items showed statistically significant differences according to ADL index.

V. CONCLUSION

The aged people have weak mind and body function, it is very important to deploy the interiors. This study examined report studied the residential needs of elderly people by ADL index.

Summarizing the above, first, responders' ADL average is 3.45. It means that the symptoms of senility is not deepened. As looking at each function, ADL index of physical function is 3.58 and it is the highest. Followers are psychological, life style, physiological, and sensory. So, deterioration of body function is first-starter of symptoms of senility. Aspects of psychological state and living style, this study show well the seniors' feature, decrease of adjustment for new circumstance, based on "fear of relocation", "nostalgia for old days", and "social isolation'.

Second, the requirement of elderly people's environmental need is averaged 3.72 and the hallway is relatively high ranked because it is a passage to move.

Table 4. Residential Needs by ADL Index[b)]

	housing guidelines	ADL index high(98~145)	ADL index low(49~97)	mean	t-value
Site	back yard, garden	3.90	3.75	3.84	.95
	green zone	4.09	4.03	4.07	.37
	sufficient supply of sunshine	4.37	4.23	4.31	1.36
	parking lot	3.74	3.65	3.71	.53
	entrance free from stairways and floor level changes	3.91	3.43	3.73	2.92**
	slip-resistant floor	4.33	4.10	4.24	2.50**
	outdoor lighting	4.17	3.87	4.05	2.67**
	warehouse	3.96	3.80	3.90	1.06
	total	4.06	3.86	3.98	2.28*
Porch	flat or slow-grade floor	4.13	3.77	3.99	2.59**
	wheelchair accessibility	3.88	3.48	3.73	2.50**
	easy-to-handle door knob	4.20	4.03	4.14	1.62
	emergency/security alarm equipment	4.11	3.82	3.99	2.00*
	adequate clearance width	4.09	3.93	4.03	1.36
	grab bar for putting on/off shoes	3.98	3.37	3.74	3.61**
	total	4.06	3.73	3.93	3.15**
Hallway	free from protrudent obstacles	4.29	3.98	4.17	3.16**
	grab bar, handrail	4.05	3.55	3.86	3.23**
	slip-resistant floor	4.27	4.07	4.19	2.00*
	total	4.20	3.87	4.07	3.38***
Stairway	low risers, slow grade	4.24	3.85	4.08	3.28***
	wheelchair-accessible ramp	3.74	3.20	3.53	3.46***
	illuminated nosing	4.20	3.82	4.05	2.91**
	total	4.06	3.62	3.89	3.70***
Kitchen	Height-adjustable sink	3.26	2.80	3.08	2.78**
	safe and convenient-to-use kitchenware	4.01	3.70	3.89	2.83**
	good ventilation	4.29	3.82	4.10	4.14***
	total	3.85	3.44	3.69	4.24***
Bathroom	wheelchair-accessible entrance	3.52	3.13	3.37	2.60**
	slip-resistant floor	4.33	4.13	4.25	2.00*
	grab bar/ handrail on the wall	3.80	3.25	3.58	3.32***
	grab bar/ handrail on the door	3.73	2.93	3.42	5.19***
	auxiliary heating	3.82	3.50	3.69	2.57**
	bathtub safety bar	3.68	3.07	3.44	3.73***
	accessible bathtub	3.13	3.15	3.14	-.13
	seating-accommodating bathtub	3.42	3.13	3.31	1.67
	easy-to-handle tap	3.00	2.77	2.91	1.40
	emergency alarm	3.55	3.03	3.35	3.32***
	total	3.65	3.22	3.48	4.49***
Bedroom	southern exposure	4.18	4.03	4.12	1.27
	free from rising threshold and floor level changes	3.40	3.43	3.41	-.23
	wheelchair-accessible entrance	3.32	3.00	3.20	2.02*
	affiliated bathroom	3.54	3.17	3.39	2.10*
	emergency alarm	3.70	3.02	3.43	4.63***
	total	3.63	3.33	3.51	3.18**
Facility	security equipments	3.97	3.60	3.82	2.68**
	elevator or platform lift	2.95	2.43	2.75	3.03**
	total	3.46	3.02	3.28	3.68***
	TOTAL	**3.85**	**3.51**	**3.72**	**4.60*** **

* P< .05, ** P< .01, *** P< .001 b) 5-point Likert Type scale

In the order of elderly people's resident needs : site circumstance, porch, stairs, kitchen, bedroom, bathroom, facilities. Generally, the elderly dwellers think the safety of floor materials importantly and the demands for sufficient supply of sunshine and southward-expose are relatively high, but width or structure of place are low ranked.

Third, a group having high ADL figure is apt to require the environmental need more than a group having low ADL figure.

In view of the results so far achieved, we can reach the conclusion.

Building the house for the seniors, there must be the plan reflected ADL. Minimizing the physical obstacles, the house has to provide the convenient place for elderly dwellers' self-support.

Next, constructors had better use the slip-resistant materials as well as deploy the device for their moving or walking. It is good to plan interiors for seniors' safety and convenience.

Finally, considering the elderly dwellers' psychologic features: attachment to old memories and fear of relocation, choices of right for house and residence sequence are endowed to seniors.

Respondents for this study are early-senior group, there must be further evaluation for much older people. Also, data for investigation (ADL and house design guideline index) need to complement.

References

1) Butler, A., Oldman, C. & Greve, J., Housing and Elderly, Sheltered Housing for the Elderly, National Institute of Sociology, London, 1983.
2) Chang I. H. & Choi, S. J., Geriatric Welfare, Seoul National University, 1987.
3) Choi, S. J. , "Prospect and Proposal on The Elderly Life", Seoul National University Research Project Report, 1992.
4) Dakaki. K., Housing of The Elderly, Yubikacu. 1993.
5) Golant, S. M., "Individual Differences Underlying the Dwelling Satisfaction of the Elderly", Journal of Social Issues, Vol.38 No.3, 1982.
6) Jo S. Y. et al, Factility Management for The Elderly, Hakmunsa, 1997.
7) Kim, T .H., Gerontology, Kyomunsa, 1997.
8) Lee, K. O. et al., "A Study on the support of Elderly People", Korea Institute for Health And Social Affairs, 1990.
9) Montgomery, J. E., "The Housing Patterns of Older Families", The Family Coordinator, Vol.21, 1972.
10) Nomura. H, "Architecture Knowledge", in R. Machida. et al. , Study of Housing, Gakaku Douin, 1995
11) Sung M. O., "A Study on the direction of the serviced housing for the Korean aged people", Journal of the Korea Gerontological Society, 1994. Vol. 14, No. 2.
12) Valins. M., Housing for Elderly People: A Guide for Architects. New York: Van Nostrand Reinhold co, 1988.
13) Weal. F., & Weal. F., Housing for the Elderly: Options and Design, N.Y.: Nichols Publishing, 1988.