

A Study of Health and Food Related Behaviors Among the Free-Living Elderly by Household Type*

Keum-Jee Kang[§]

Department of Food & Nutrition, DukSung Women's University, Seoul, 132-714, Korea

The aim of this study was to investigate the effects of household type on the health- and food-related behavior of the elderly. The survey was conducted on 304 free-living elderly persons in Chun-Chon city in 1999. The subjects were divided into three groups by their household types : living alone (n=35), living with their spouses (n=59), and living with their extended family (n=191). The results were obtained by personal interviews using questionnaires. Compared to the group living with their spouses and/or extended families, the elderly living alone were : less satisfied with the amount of monthly pocket money available; less involved in social activities; taking less vitamin supplements; doing less physical exercise; more frequently skipping meals and dining out; less frequently consuming meats, vegetables, fruits and seaweed; and having the highest rate of depression. The elderly living with their spouses tended to have the best physical functions and the greatest ability to carry out basic daily activities. The elderly living with their extended families had a higher incidence of diseases compared to the other groups. The preferred snacks were cookies for the elderly living alone, and fruits for the other two groups. In summary, it has been shown that household type should be taken into consideration for formulating adequate future strategies for effective health and nutrition programs.

Key words : elderly, household types, health-related behaviors, food-related behaviors ADL, IADL

INTRODUCTION

According to the statistics by the Ministry of Health and Welfare in the year 2000, the average life expectancy of Koreans was 74.9 years (71.0 years for men and 78.6 years for women), and is expected to increase to 77 years in 2010.¹⁾ The percentage of the population over 65 years old was 6.6% in 1998, and is projected to rise to 9.9% in 2010, and 13.2% in 2020. Korea is joining the aging societies of the world, and the problem of supporting the elderly and their welfare is becoming serious. The traditional family values of supporting one's own elderly are no longer strong, due to rapid industrialization, the development of the nuclear family system, and the increased number of women employed outside the home. Consequently, the number of the elderly living with their children is decreasing, thus resulting in an increased tendency for the elderly to live alone or with their spouses.²⁾ A study carried out by Baek³⁾ showed that the elderly population living alone or with their spouses was 7.0% in 1975, 23.3% in 1990, and 53.1% in 1995, and a further increase is projected. This increased number of elderly households reflects a general trend towards smaller family sizes and/or a lack of willingness of the

family to support their own elderly; this increases the burden to society in having to support the elderly, and thus increased systemic support in health and food management is needed.

The deterioration of the physical and mental capacities due to aging affects the activities of daily life and health management in the elderly. According to the numerous studies conducted previously, the nutritional status of the elderly was unsatisfactory.⁴⁻⁸⁾ The nutritional status in individuals is closely related to physical, psychological, social and economic factors⁹⁻¹¹⁾ as well as to changes in family relationships.¹³⁻¹⁸⁾

Nutritional status is also influenced by household type. The elderly living alone were not motivated enough to prepare a full meal for themselves, while poverty and a lack of interest in cooking also prevented the preparation of nutritious meals.¹²⁾ Kim et al.¹³⁾ reported that the elderly living with their children had a good awareness of health and showed higher intakes of nutrients. The elderly living in a large family had better intakes of nutrients, compared to the elderly living alone who had a higher frequency of feeling isolated and depressed.^{14,16,17)} However, there is also a contradictory study which reported that nutrient intake of the elderly was lower, as the number of family members increased in extended families.¹⁸⁾ Lee et al.¹⁵⁾ on the other hand, reported that the elderly living by themselves showed good nutritional status and had no problems in carrying out activities of

* This study was supported by the 2001 research fund of DukSung Women's University.

Accepted : July 10, 2002

[§] To whom correspondence should be addressed.

daily living. It therefore appears that there are many contradictory results regarding the nutritional intakes and food habits of the elderly living by themselves.

This study was conducted on elderly persons who were 60 years and older, and who lived in Chun-chon city. The subjects were divided into three groups by their household types : living alone (n=35), living with their spouses (n=59), and living with their extended family (n=191). The following factors were analyzed according to household type : the health- and food-related behaviours, food intake frequencies, psychological conditions, physical functions, the ability to carry out basic daily activities, and the ability to use the utensils necessary for daily living. The purpose of this study was to provide basic data needed for improving those nutrition policies and nutrition programs which target the elderly.

SUBJECTS AND METHODS

1. Data Collection

This study was carried out from December, 1999 to March, 2000. The subjects of this study were the free-living elderly from Chun-chon city who had at least one or more children. The distribution of age was between over sixty and under eighty. The subjects were recruited from public locations, such as senior citizen centers and public parks. The enumerators were sophomores in college and were trained by the investigator. The enumerators used the prepared questionnaires to interview the subjects and to record their responses. A total of 314 questionnaires out of 319 were used for data analysis, as the remaining 5 were incomplete.

2. Questionnaires

The questions on the general characteristics of the subjects were : gender, residence, years of schooling, monthly pocket money, household incomes, levels of satisfaction with the pocket money, and the involvement in social activities. Health-related behaviors included the history of smoking and drinking, frequency of drinking, disease status, vitamin supplementation, frequency of physical exercise, and the use of health foods. Food-related behaviors included eating alone or with people, levels of appetite, number of meals per day, the most important meal of the day, the frequency of skipping meals and dining out, the most favoured taste, and the times and kinds of snacks.

Food frequency was determined according to the food groups : meats, vegetables I (green and yellow), vegetables II (white), fruits, milk, seaweed, and beans. Frequencies were as follows : eating rarely, eating once a month, eating 2 to 3 times a week, eating everyday, and eating at every meal time.

Psychological depression and frequency of depression were studied by using the CES-D (Center for Epidemiological Studies-Depression). There were twelve questions for measuring the levels of depression : feeling low, speaking very little, feeling lonely, feeling sad, feeling things are not going well, having troubles, feeling one's work is meaningless, feeling afraid, having no appetite, inability to sleep, feeling in a rut, concentrating on problems. The frequency of these feelings was scored as follows : 1 point for "not at all", 2 points for "once or twice a week", 3 points for "3 or 4 times a week", 4 points for "5 or more times a week". The highest possible score was 48 for a serious depression and the lowest score was 12 for no depression.

Physical functions (eyes, ears, teeth, walking, mental capacity), the ability to carry out daily activities (walking, dressing, eating, toiletry, grooming, bathing) and the ability to use the utensils necessary for daily living (calling phones, cooking, washing clothes, traveling, managing financial accounts, etc), were also studied. The scoring was done as follows : 1 point for "not able at all or not satisfied", 2 points for "barely able", 3 points for "able with a little help", 4 points for "able to manage for themselves", and 5 points for "highly satisfactory".

The household type were divided into three groups; living alone, living with spouse and living with children.

3. Statistical analysis

The results of the study were analyzed by using the SPSS-PC program. Frequency and percentages were used to express general characteristics, health-related behaviours, food-related behaviours, and food intake frequencies. The statistical significance between the groups was analyzed by using the χ^2 -test.

Feelings of depression, frequency of depression, satisfaction with life, levels of physical functions, abilities to carry out basic activities and activities requiring the use of instruments were analyzed by using means and standard deviations; the determination of significance between the groups was done by the F-values in One-way ANOVA, and the scheffe test was used for conforming significance between groups.

RESULTS AND DISCUSSION

1. General characteristics

Table 1 describes the general characteristics of the subjects according to their household types. Most subjects were female; 68.1% of the subjects were female compared to 31.9% who were male. Regarding household type, 35 subjects lived alone (22.9% males and 77.1% females), 59 people lived with their spouses (55.9% males and 44.1% females), and the majority (191 sub-

Table 1. General characteristics of the elderly subjects according to household type

N(%)

		alone	with spouse	with children (extended)	total	
Sex	male	8(22.9)	33(55.9)	50(26.2)	91(31.9)	19.872
	female	27(77.1)	26(44.1)	141(73.8)	194(68.1)	
Residence	urban	17(48.6)	35(59.3)	120(63.8)	172(61.0)	2.975
	rural	18(51.4)	24(40.7)	68(36.2)	110(39.0)	
Education level	no education	18(50.0)	15(23.4)	76(39.4)	109(37.2)	13.793
	drop-out elementary	3(8.3)	15(23.4)	36(18.7)	54(18.4)	
	Elementary	8(22.2)	17(26.6)	46(23.8)	71(24.2)	
	middle school	4(11.1)	10(15.6)	13(6.7)	27(9.2)	
	high school	3(8.3)	5(7.8)	16(8.3)	24(8.2)	
	college ≤	0(0)	2(3.2)	6(3.1)	8(2.7)	
Pocket money (thousand won/month)	<100	9(25.0)	11(17.5)	71(36.4)	91(31.0)	23.024*
	100 - 199	11(30.6)	19(30.2)	61(31.3)	91(31.0)	
	200 - 299	7(19.4)	12(19.0)	37(19.0)	56(19.0)	
	300 - 399	3(8.3)	9(14.3)	15(7.7)	27(9.2)	
	400 - 499	2(5.6)	3(4.8)	7(3.6)	12(4.1)	
	500 ≤	4(11.1)	9(14.3)	14(2.1)	17(5.8)	
Household income (thousand won/month)	≤ 499	9(30.0)	8(13.1)	9(4.8)	26(9.4)	4.219
	500 - 699	7(23.3)	15(24.6)	15(8.0)	37(13.3)	
	700 - 999	3(10.0)	4(6.6)	26(13.9)	33(11.9)	
	1000 - 1499	3(10.0)	19(31.1)	68(36.4)	90(32.4)	
	1500 - 1999	3(10.0)	9(14.8)	38(20.3)	50(18.0)	
	2000 - 2499	4(13.3)	4(6.6)	22(11.8)	30(10.8)	
	2500 ≤	1(3.3)	2(3.3)	9(4.8)	12(4.3)	
Feeling about pocket money	much too little	8(22.2)	5(8.1)	12(6.2)	25(8.5)	1.798
	too little	8(22.2)	18(29.0)	56(28.7)	82(28.0)	
	enough	16(44.4)	33(53.2)	111(56.9)	160(54.6)	
	more than enough	4(11.1)	6(9.7)	16(8.2)	26(8.9)	
Social Activity	None	12(33.3)	12(18.8)	48(25.0)	72(24.7)	10.896
	once a month	5(13.9)	8(12.5)	23(12.0)	36(12.3)	
	2-3/a month	3(8.3)	8(12.5)	25(13.0)	36(12.3)	
	once a week	11(30.6)	19(29.7)	34(17.7)	64(21.9)	
	2-3/a week	5(13.9)	17(26.6)	62(32.3)	84(28.8)	

*p < 0.05

jects) lived with their children (26.2% males and 73.8% females). The household types of the elderly vary among different regions. Kim et al.¹⁹⁾ reported that 63.3% of their study subjects lived with their sons and 20.7% lived alone. Kim et al.¹³⁾ reported that among their elderly subjects from the Asan area in Chung-Nam Province, 16.4% lived alone, 46.4% lived with their spouses and children, and 37.4% lived with their spouses. A study in Chung-Buk Province²⁰⁾ reported that 52.2% of the elderly lived with their children and 35.2% lived by themselves. In a study in the Sung-Ju area of Kyoung-Buk Province,²¹⁾ 50.7% of the subjects lived with their spouses, 7.4% were men lived alone, and 37.8% were women living by themselves. The household types of the elderly differ between urban and rural areas : 63.8% of the elderly in urban areas live with their children, while 51.4% of those in rural areas live by themselves.²¹⁾ It appears that more elderly in the urban areas live with

their children because they help with the housework and child minding for their daughters or daughters-in-law who work outside the home. In rural areas, there appears to be more elderly living by themselves because their children left for urban areas.

Concerning the levels of education, approximately half of the present subjects had no schooling or had dropped out of elementary school : the elderly living alone (58.3%), living with their spouses (46.8%), and living with their children (58.1%). Approximately a quarter of the elderly in all three groups finished elementary school education. The level of education was the highest in the group living with their spouses. The amounts of monthly pocket money for all the subjects were : 31.0% under 100,000won, 31.0% between 100,000 and 190,000, 19.0% between 200,000 and 290,000won, 9.2% between 300,000 and 390,000won, 4.1% between 400,000 and 490,000won, and 5.8% over 500,000won. Han et al.²⁰⁾

reported that 25.1% of their subjects spent less than 30,000won per month, 28.1% between 30,000 and 60,000won, 26.3% between 60,000 and 100,000won, and 20.5% spent more than 100,000won. The subjects of the present study spent much more than the other studies regardless of their household types; the majority spent between 100,000 to 300,000 won per month. A higher proportion of the elderly living with the extended family (36.4%) spent less than 100,000won, compared with the other groups. Extended family may need less money because many things are provided for them. The pocket money was considered to be much too little or too little, especially by the group living alone : 44.4% of the group living alone, 37.1% of the group living with their spouses, and 34.9% of the group living with their children. More than half of the subjects in the groups living with their spouses (53.2%) and their children (56.9%) considered their pocket money was enough, while 44.4% of the group living alone felt that they had enough pocket money. The elderly subjects living alone, in general, seemed less satisfied with their pocket money.

Monthly household incomes for all the subjects were as follows : 9.4% under 500,000won, 13.3% between 500,000 and 700,000 won, 11.9% between 700,000 and 1,000,000 won, 32.4% between 1,000,000 and 1,500,000 won, 18.0% between 1,500,000 and 2,000,000 won, and 4.3% above 2,500,000 won. A higher proportion of the elderly living alone had a monthly income of less than 500,000, compared to the other groups. Regarding the social activities involving churches, buddhist temples, open universities for the elderly, and physical exercise were commonly held social activities. The elderly living

alone were much less involved which may be due to a lack of companions, compared with the elderly living with their spouses or their extended families.

2. Health-related behaviors

Table 2 shows the health-related behaviours of the subjects according to their household types. Approximately a quarter of the subjects (24.7%) reported having no disease, while the rest (75.3%) had one or more diseases. Another study carried out in Chung-Buk Province reported 78.2% of their elderly subjects had diseases²⁰⁾ this is similar to the results in the present study. Lee *et al.*¹⁵⁾ also reported that 89.7% of their elderly subjects had diseases, and the rate was higher among the elderly without their spouses. A slightly higher proportion of the elderly living with the family had a diseases in the present study, compared to the other groups, even though the difference was not significant. More elderly living alone tended to smoke, which may be due to loneliness or boredom. A significantly higher proportion of the elderly living with their spouses drank, compared to the other groups ($p < 0.05$).

According to the 1997 Korean national nutrition survey, 18.8% of the males and 17.6% of the females took nutrition supplements. Vitamin supplementation practice of the subjects in the present study was : 14.9% taking presently, 33.1% not taking presently but had taken previously, and 52.0% had never taken. Regarding the use of health foods : 51.0% of the subjects in the present study had previously taken them, 15.2% were taking them, and 33.9% had never taken them. The practice of using health foods varies according to the region. Park

Table 2. Health-related behaviors according to household type

N(%)

		alone	with spouse	with children (extended)	Total	χ^2
Disease status	Having disease	25(71.4)	42(70.0)	150(77.7)	217(75.3)	1.798
	No	10(28.6)	18(30.0)	43(22.3)	71(24.7)	
Smoking	Smoker	10(27.8)	14(23.0)	43(22.5)	67(23.3)	9.002
	Ex-smoker	4(11.1)	18(29.5)	28(14.7)	50(17.4)	
	Non-smoker	22(61.1)	29(47.5)	120(62.8)	71(59.4)	
Drinking	Drinker	15(45.5)	31(52.5)	85(45.7)	131(47.1)	11.701*
	Ex-Drinker	5(15.2)	9(15.3)	9(4.8)	23(8.3)	
	Non-Drinker	13(39.4)	19(32.2)	92(49.5)	124(44.6)	
Vitamin supplementation	Previous	16(45.7)	13(22.4)	60(34.1)	89(33.1)	6.106
	Present	3(8.6)	11(19.0)	26(14.8)	40(14.9)	
	None	16(45.7)	34(58.6)	90(51.1)	140(52.0)	
Health food	Previous	17(50.0)	27(47.4)	87(52.4)	131(51.0)	0.625
	Present	6(17.6)	9(15.8)	24(14.5)	39(15.2)	
	None	11(32.4)	21(36.8)	55(33.1)	87(33.9)	
Exercise frequency	Over once a week	14(38.9)	35(57.4)	69(36.3)	118(41.1)	8.544*
	Under once a week	22(61.1)	26(42.6)	121(63.7)	169(58.9)	

* $p < 0.05$

et al.²³⁾ reported that 59.1% of the elderly in the Asan area of Chung-chong Province were taking health foods, but only 23.7% of the elderly subjects from the Sung-Ju area in Kyoung-Buk Province were taking health foods or nutrition supplements.¹⁹⁾ Yim et al.⁶⁾ reported that in the Su-Won area only 23.7% of the subjects took health foods. According to household type, Kim et al.¹³⁾ found that 12.5% of the elderly living alone took nutrition supplements or drugs for enrichment, while more elderly (22.9%) living with their children took nutrition supplements. The present study shows that the elderly living alone took less vitamin supplements and more health food, compared to the other groups. More than half of the elderly living with their spouses did physical exercise

more than once a week, while more than 60% of the elderly living alone or living with their children did physical exercise less than once a week, and this was statistically significant. It appears that the group living with their spouses were motivated to do more exercise with their companions compared to the other groups.

3. Food-related Behaviors

Table 3 shows food-related behaviour according to household type. The elderly living alone seemed to have better appetites than the other groups, even though this was not statistically significant : this result is contrary to a previous report that showed that poor appetites among the people living alone resulted in poor nutrient

Table 3. Eating behaviors according to household type

N(%)

		alone	with spouse	with children (extended)	Total	χ^2
Person with whom he/she eats	alone	28(77.8)	17(30.4)	25(13.0)	70(24.6)	186.249
	children	2(5.6)	8(14.3)	157(81.8)	167(58.8)	
	friends	6(16.7)	12(21.4)	7(3.6)	25(8.8)	
	spouse	0(0)	19(33.9)	3(1.6)	22(7.7)	
Appetite	poor	3(8.3)	3(4.8)	19(9.8)	25(8.6)	4.166
	indifferent	24(66.7)	51(82.3)	140(72.5)	215(73.9)	
	good	9(25.0)	8(12.9)	34(17.6)	51(17.5)	
Meal frequency	two	5(13.9)	6(9.7)	12(6.2)	23(7.9)	4.630
	three	30(83.3)	54(87.1)	177(91.2)	261(89.4)	
	four	1(2.8)	2(3.2)	3(1.5)	6(2.1)	
	over four	0(0)	0(0)	2(1.0)	2(0.7)	
Skipping meals	breakfast	13(52.0)	20(43.5)	37(31.9)	70(37.4)	4.971
	lunch	7(28.0)	16(34.8)	53(45.7)	76(40.6)	
	dinner	5(20.0)	10(21.7)	26(22.4)	41(21.9)	
Meal thought the most important	breakfast	19(55.9)	35(57.4)	129(69.7)	183(65.4)	12.505*
	lunch	9(26.5)	6(9.8)	17(9.2)	32(11.4)	
	dinner	6(17.6)	20(32.8)	39(21.1)	65(23.2)	
Frequency of dining-out	2/week	2(6.7)	1(1.9)	4(2.4)	7(2.8)	13.838*
	1/week	7(23.3)	7(13.0)	10(5.9)	24(9.5)	
	1/2 week	2(6.7)	7(13.0)	31(18.3)	40(15.8)	
	1/month	19(63.3)	39(72.2)	124(73.4)	182(71.9)	
Taste thought the best	sweet	18(54.5)	31(52.5)	124(67.8)	173(62.9)	15.638*
	sour	3(9.1)	4(6.8)	7(3.8)	14(5.1)	
	bitter	2(6.1)	2(3.4)	8(4.4)	12(4.4)	
	salty	3(9.1)	2(3.4)	18(9.8)	23(8.4)	
	hot spicy	7(21.2)	20(33.9)	26(14.2)	53(19.3)	
Snack time	between breakfast and lunch	2(5.7)	8(13.3)	18(9.8)	28(10.0)	5.003
	between lunch and dinner	26(74.3)	31(51.7)	107(58.2)	164(58.8)	
	after dinner	7(20.0)	21(35.0)	59(32.1)	87(31.2)	
Snack type	rice-cakes	8(22.9)	10(16.4)	30(16.1)	48(17.0)	18.283*
	cookies	10(28.6)	7(11.5)	30(16.1)	47(16.7)	
	milk	6(17.1)	6(9.8)	13(7.0)	25(8.9)	
	yoghurt	2(5.7)	3(4.9)	4(2.2)	9(3.2)	
	fruit	9(25.7)	34(55.7)	99(53.2)	142(50.4)	
	the others	0(0)	1(1.6)	10(5.4)	11(3.9)	

*p < 0.05

intakes.⁹⁾ Regarding the number of meals per day, 89.4% of the subjects in the present study had 3 meals. Ahn *et al.*²⁴⁾ reported that 74% of their elderly subjects had regular meals. Chung *et al.*²⁵⁾ reported that 58.5% of the urban elderly had regular meals. Compared to Chun study²⁶⁾ which reported that only 48.4% of the office workers had regular meals, the elderly appear to be better at taking regular meals, which could be attributed to their having more time available. In the present study, the proportion of the elderly having only two meals a day was higher among the group living alone. It appears that the subjects living alone tend to skip meals more than those living with other people. The most frequently skipped meal was lunch (40.6%), compared to breakfast (37.4%), and dinner (21.9%). Subjects who were living

alone skipped breakfast more than the others. It appears that the subjects living with their spouses and/or their families could be provided with breakfast by the family. Breakfast was considered as the most important meal of the day by 65.4% of the subjects, especially by those living with their families (69.7%). Traditionally, dinner was considered the most important meal for the family, because all family members gathered together for dinner; however, changes in lifestyles could have promoted breakfast to be the most important meal for the family.

The practice of dining out is increasing in Korea due to a busy modern life, economic development, and the expansion of the restaurant industry. In the present study, 71.9% of the subjects were dining out at least once a month. However, Park *et al.*²³⁾ reported that 68.2% never

Table 4. Consumption patterns of food groups according to household type

N(%)

		alone	with spouse	with children (extended)	Total	χ^2
Meats	seldom	2(5.6)	5(8.1)	7(3.7)	14(4.9)	9.421
	once a month	9(25.0)	8(12.9)	26(13.7)	43(14.9)	
	2-3 times/week	16(44.4)	40(64.5)	109(57.4)	165(57.3)	
	everyday	8(22.2)	9(14.5)	44(23.2)	61(21.2)	
	every meal	1(2.8)	0(0)	4(2.1)	5(1.7)	
Vegetables(green and yellow)	seldom	1(2.9)	1(1.6)	2(1.1)	4(1.4)	4.142
	once a month	0(0)	2(3.2)	3(1.6)	5(1.7)	
	2-3 times/week	8(22.9)	9(14.5)	29(15.3)	46(16.1)	
	everyday	10(28.6)	23(37.1)	62(32.8)	95(33.2)	
	every meal	16(45.7)	27(43.5)	93(49.2)	136(47.6)	
Vegetables(white)	seldom	1(2.8)	1(1.6)	4(2.1)	6(2.1)	10.025
	once a month	1(2.8)	3(4.8)	2(1.1)	6(2.1)	
	2-3 times/week	9(25.0)	7(11.3)	35(18.4)	51(17.7)	
	everyday	11(30.6)	34(54.8)	85(44.7)	130(45.1)	
	every meal	14(38.9)	17(27.4)	64(33.7)	95(33.0)	
Fruit	seldom	0(0)	2(3.2)	1(0.5)	3(1.0)	7.970
	once a month	1(2.8)	3(4.8)	7(3.7)	11(3.8)	
	2-3 times/week	19(52.8)	22(35.5)	77(40.5)	118(41.0)	
	everyday	15(41.7)	33(53.2)	92(48.4)	140(48.6)	
	every meal	1(2.8)	2(3.2)	13(6.8)	16(5.6)	
Milk	seldom	7(20.0)	11(18.3)	37(19.7)	55(19.4)	4.177
	once a month	8(22.9)	7(11.7)	28(14.9)	43(15.2)	
	2-3 times/week	8(22.9)	22(36.7)	67(35.6)	97(34.3)	
	everyday	11(31.4)	17(28.3)	50(26.6)	78(27.6)	
	every meal	1(2.9)	3(5.0)	6(3.2)	10(3.5)	
Seaweed	seldom	2(5.7)	3(4.8)	6(3.2)	11(3.8)	8.086
	once a month	4(11.4)	12(19.4)	26(13.8)	42(14.7)	
	2-3 times/week	24(68.6)	31(50.0)	105(55.6)	160(55.9)	
	everyday	3(8.6)	14(22.6)	35(18.5)	52(18.2)	
	every meal	2(5.7)	2(3.2)	17(9.0)	21(7.3)	
Beans	seldom	2(5.6)	0(0)	2(1.1)	4(1.4)	12.860
	once a month	0(0)	8(12.9)	16(8.5)	24(8.4)	
	2-3 times/week	15(41.7)	23(37.1)	77(40.7)	115(40.1)	
	everyday	14(38.9)	16(25.8)	59(31.2)	89(31.0)	
	every meal	5(13.9)	15(24.2)	35(18.5)	55(19.2)	

*p < 0.05

dined out, 14.5% at a rate of once a month, and 11.8% two or three times a month. The elderly subjects living alone dined out significantly more than the other groups ($p < 0.05$), probably because they did not want to cook or eat alone. The most favoured taste was the sweet taste, which agrees with other studies.^{19,24,27} The group living with their families showed a significantly higher preference for sweet foods, compared to the other groups ($p < 0.05$). The group living with their spouses preferred a sweet taste together with a hot taste. The timing of snacks for the group living alone was between lunch and dinner, while for the other groups was after dinner while watching TV with the family. Ahn et al.²⁴ reported that fruits were the most favored snack food for their elderly subjects, while another preference study carried out among the elderly population showed that 39% were for any food available, 26.0% for potatoes and sweet potatoes, and the rest were for cookies, rice cakes, and bread.¹⁹ The group living alone in the present study preferred rice cakes and cookies, while the groups living with their spouses or families preferred fruits ($p < 0.05$). This may be because of easy spoilage of fruits and the need for peeling, while cookies are easy to keep.

4. Food Intake Frequency

Table 4 shows food intake frequency among the subjects. Numerous studies reported that food intake is influ-

enced by different household types,^{15,17,18,27} and the elderly living alone tend to have lower frequencies. Similar to the other findings, the group living alone in the present study had lower intake frequencies of meat, green/yellow vegetables and white vegetables, compared to the other groups; this may be due to the vegetables becoming easily spoiled and being difficult to cook. Intake of milk was low in all subjects regardless of the household types. Other studies also reported the low calcium intake among the elderly,^{4,20,22,23,27,28} compared to other nutrients, which may be attributed to subjects.

5. Psychological states, physical functions and the ability to carry out daily activities

Table 5 illustrates the results related to psychological states, physical functions and the ability to carry out daily activities. Psychological depression would have a negative influence on the health status, and especially on the food-related behavior.¹⁴ Depression among the elderly is found to be common, especially among the elderly living alone. Even though there were no significant differences among the three groups in this study, the elderly living alone tended to have higher incidences and frequencies of depression, compared to the other groups. Yim et al.¹⁶ also reported a higher frequency of having depression and poor nutrient intakes among the elderly living alone. Kim²⁹ reported that the frequency of having depre-

Table 5. Depression, physical status and activity score of daily living according to household type¹⁾

		alone	with spouse	with children (extended)	Total	F-value
Depression		23.67±7.27	21.85±6.12	22.76±6.99	22.67±6.84	0.799
Depression frequency score		22.73±7.88	21.41±6.6	21.89±6.95	21.89±6.98	0.385
Physical status	eye	2.89±1.17	3.11±1.03	2.86±0.98	2.92±1.02	1.428
	ear	3.58±0.90	3.56±1.04	3.36±0.98	3.42±0.99	1.478
	tooth	3.44±1.05	3.79±0.93	3.33±1.06	3.44±1.04	0.435*
	walking	3.41±1.16	3.77±1.00	3.60±1.05	3.61±1.06	1.303
	mental	3.97±0.90	4.10±0.80	4.01±0.89	4.02±0.87	0.315
Activities of daily living	walking	4.89±0.46	4.85±0.73	4.88±0.68	4.88±0.66	0.050
	dressing	4.83±0.56	4.97±0.26	4.92±0.56	4.92±0.51	0.768
	eating	4.94±0.33	4.97±0.26	4.92±0.48	4.93±0.42	0.271
	toileting	4.94±0.33	4.97±0.26	4.91±0.64	4.93±0.54	0.258
	grooming	4.78±0.64	4.97±0.26	4.88±0.63	4.88±0.57	1.296
	bathing	4.50±1.28	4.82±0.76	4.69±0.92	4.69±0.94	1.316
Instrumental activities of daily living	calling phones	4.86±0.83	4.90±0.44	4.51±1.20	4.63±1.06	4.251*
	doing paid work of any kind	4.64±1.02	4.49±1.23	4.36±1.49	4.42±1.39	0.732
	preparing or cooking without help	4.61±1.23	4.56±0.98	4.42±1.39	4.47±1.29	0.517
	doing housework without help	4.42±1.46	4.40±1.26	4.35±1.44	4.37±1.40	0.065
	washing clothes	4.31±1.64	4.26±1.39	4.28±1.51	4.28±1.49	0.016
	travelling on bus or train without help	4.25±1.76	4.73±0.85	4.31±1.44	4.39±1.39	2.231
	managing drug use	4.25±1.76	4.65±1.04	4.09±1.58	4.23±1.51	3.164*
managing financial accounts	4.61±1.23	4.79±0.79	4.53±1.19	4.59±1.13	1.274	

1) Scores of depression, physical status, activities of daily living, instrumental activities of daily living are 1. to 5.0.

* $p < 0.05$

ssion was higher in the elderly who did not have their spouses or who lived with small numbers of extended family.

One can lose confidence if one cannot freely move about, which would affect one's food-related behaviors and consequently one's nutritional status. The physical functions tested were : eye sight, hearing, teeth, walking, mental capacity. The scoring of the functions was from 1 point poor to 5 points excellent. All the subjects in the study scored above average in all physical function tests (means of 2.92 to 4.02), and excelled in mental ability scores (4.02 ± 0.87), as presented in Table 5. Dental conditions in the group living with their spouses were significantly better than the other groups ($p < 0.05$). Overall, physical function tended to be better in the group living with their spouses, compared to the other groups.

The questions on the ability to conduct the basic daily activities consisted of six items : walking, dressing/undressing, feeding oneself, toiletry, personal grooming, bathing. Almost everyone attained full scores as shown in Table 5. This may be due to the sample characteristics in this study where the subjects were recruited from the elderly's meeting places or from public parks. Generally, higher scores were obtained by subjects living with their spouses, compared to other subjects.

The ability to use everyday utensils is a good indicator for detecting early signs of Alzheimer's disease. The study conducted on the Korean elderly living in the U.S.A. reported that the ability to conduct daily activities and to use utensils deteriorated with aging.⁸⁾ Kim *et al.*³⁰⁾ reported that 43.5% of the elderly subjects in their study had difficulty in using at least one utensil, and another study in the Sung-Ju area of Kyoung-Buk²⁰⁾ Province reported that only 42.7% of the elderly subjects could use the 10 utensils in their study. The present study found that no subjects had difficulties in using the instruments. (Table 5) A higher percentage of the elderly living with family could make phone calls unassisted, than the other groups. Regarding the ability to manage drugs, the group living with their spouses had significantly higher scores than the other groups ($p < 0.05$).

In conclusion, the elderly living alone showed the lowest level of satisfaction with their available pocket money and least involvement in social activities. Regarding health-related behaviours, the elderly living with their family had the highest incidence of diseases; taking vitamin supplements and doing physical exercise was the lowest among the elderly living alone. The elderly living alone skipped meals most and dined out most frequently. The elderly living alone preferred cookies as their snack food, while the elderly living with their spouses/families preferred fruits. Regarding food intake frequency, the elderly living alone had the lowest frequency of eating meats, vegetables, fruits, and seaweed. The rate of depre-

ssion was the highest among the elderly living alone. Better physical conditions and the ability to carry out basic activities for daily living were found among the elderly living with their spouses. The present study recruited healthy, free-living elderly from Chun-chon city, and there were uneven numbers presented in the three groups coming from different household types. The results of this study showed that household types had a significant influence on food-related behaviours, health status, food intake frequencies, psychological depression, physical status, ability to carry out daily activities and the ability to use the utensils necessary for daily living. For their effectiveness, future health and nutrition programs targeting the elderly should adopt different strategies according to the target population's household types.

Literature Cited

- 1) Yearbook of health and welfare statistics, Ministry of health and welfare Republic of Korea. 46, 2000
- 2) Lim CH, Chung OB. supporting-attitude type of the married eldest son and his wife living separately from his parents. *J Kor Home Econ Assoc* 26(1) : 163-173, 1988
- 3) Baek JS. A study on the characteristic and life of condition of the aged in Korea. *National University Master thesis* 1991
- 4) Lynn LL, Kang KJ, Ludman EK. Korean elderly : diet, food beliefs and acculturation, *J Nutr Elderly* 19(2) : 1-15, 1999
- 5) Song YS, Chung HK, Cho MS. the nutritional status of the female elderly residents innursing home- I . nutritional and biochemical health stastus-. *Kor J Nutr* 28(11) : 1100- 1116, 1995
- 6) Yim KS. Strategies to improve elderly nutrition : comparisons of dietary behavior according to the mean nutrient adequacy ratio. *Kor J Comm Nutr* 4(1) : 46-56, 1999
- 7) Chang NS, Kim JM, Kim EJ. Nutritional state and dietary behavior of the free-living elderly women. *Korean J dietary culture* 14(2) : 155-165, 1999
- 8) Kim HK. Nutritional and health status of Korean elderly living in America. *Kor J Comm Nutr* 3(5) : 707-714, 1998
- 9) Schlenker ED. Nutrition in the aging. Mosby, St.Louis, 2000
- 10) Solomons NW. Nutrition and aging : potentials and problems for research in developing countries. *Nutr Review* 50 : 224-229.
- 11) Ryan VC, Bower ME. Relationship of socioeconomic status and living arrangements to nutritional intake of the older person. *J Am diet Asso* 89 : 1805-1807, 1989
- 12) Lee KJ. A comarative study on the eating behavior in Incheon : the elderly living in home and the elderly nursing home. *J East Asian Diet Life* 7(2) : 221-232, 1997
- 13) Kim CI, Park YS. Comparing health-related behaviors, food behaviors, and the nutrient adequacy ratio of rural elderly by single-elderly families vs. extended families. *Kor J Comm Nutr* 5(2s) : 307-315, 2000

- 14) Walker D, Beauchene RE. The relationship of loneliness and social isolation and physical health to dietary adequacy of independent living in elderly. *J Am diet Assoc* 91 : 300-304, 1991
- 15) Lee KW, Lee YM, Kim JH. The health and nutritional status of low-income, alone-living elderly. *Kor J Comm Nutr* 5(1) : 3-12, 2000
- 16) Yim KS, Min YH, Lee TY. Strategies to improve nutrition in the elderly : An analysis of health related factors and the nutritional risk index of the elderly. *Kor J Comm Nutr* 2(3) : 376-387, 1997
- 17) Rhie SG, Park YJ. A comparison of the dietary habit and nutrient intakes of Korean farmers according to different family patterns and farming types. *Kor J Comm Nutr* 3(5) : 739-747, 1998
- 18) Han KH, Park DY, Kim KN. Drug consumption and nutritional status of the elderly in Chung-buk area II. Nutritional status of urban and rural elderly. *Kor J Comm Nutr* 3(2) : 228-244, 1998
- 19) Kim JH, Koo BK, Kim KJ, Baek JW, Lee YK, Lee SK, Lee HS. Characteristics of eating behaviors of the long-lived elderly people in Kyungpook Sung-Ju. *Kor J Comm Nutr* 4(2) : 219-230, 1999
- 20) Han KH, Kim KN, Park DY. Drug consumption and nutritional status of the elderly in Chung-buk area. - I. Disease and drug consumption. *Kor J Comm Nutr* 3(1) : 76-93, 1998
- 21) Kwon JH, Lee SK, Kim GJ. The relationship between chewing ability and nutritional intake status in the elderly of rural community. *Kor J Comm Nutr* 3(4) : 583-593, 1998
- 22) Ministry of Health and Welfare. *97 National Nutrition Survey Report*
- 23) Park YS, Kim S, Park KS, Lee JW, Kim KN. Nutrient intakes and health-related behaviors of the elderly in rural area. *Kor J Comm Nutr* 4(1) : 37-42, 1999
- 24) Ahn SJ, Kang SA. A study on the food habits and dietary behaviors among the Korean elderly. *Korean J. Soc. Food Sci.* 15(1) : 81-94, 1999
- 25) Chung MS, Kang KJ. A survey on the health, food perceptions, and food habits of urban elderly men. *Korean J Dietary Culture* 11(4) : 455-463, 1996
- 26) Chun BH. A study for dietary life behavior of salarymen. *HanYang university Master thesis* 1998
- 27) Kim KN, Lee JW, Park YS, Hyun TS. nutritional status of the elderly living in Cheongju - I. health-related habits, dietary behaviors and nutrient intakes-. *Kor J Comm Nutr* 2(4) : 556-567, 1997
- 28) Chung CE. A study on connotative meaning of foods to elderly Korean. *Kor J Dietary Culture* 7(3) : 281-289, 1992
- 29) Kim JH. Ecological analysis of food behavior and life-style affecting the prevalence of depression in Korea. *Kor J Nutr* 26(9) : 1129-1137, 1993
- 30) Kim JH, Kwoun JH, Kim KJ, Koo BK, Lee YK, Lee SK, Lee HS. Physical characteristics and instrumental activities of daily living of the elderly in Kyungpook Sung-Ju area. *Kor J Com Nutr* 4(3) : 403-411, 1999