

Health Status, Dietary Patterns, and Living Habits of the Elderly in Jeon-ju*

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ABSTRACT

A survey of how dietary patterns and living habits were related to individual health status was undertaken amongst the elderly in Jeon-ju: the results were analyzed in order to collect information which would be useful in preventing chronic diseases and promoting health in the general population. Two hundred and thirty elderly people, 73 men (31.7%) and 157 women (68.3%) from the colleges and households in the Jeon-ju area, were studied in July and August, 1999. Average scores for men and women, respectively, in nutrition-related questions were as follows: 4.98 ± 0.24 and 5.24 ± 0.13 in a nutrition knowledge test (maximum score=10), 25.92 ± 0.39 and 26.04 ± 0.26 for nutrition attitudes (maximum=50), and 11.25 ± 0.15 and 10.70 ± 0.12 for dietary habits (maximum=15). The percentages of smokers and drinkers in the sample were 23.3% and 31.5% among men, and 3.2% and 10.8% among women, respectively, while those who took regular exercise were 67.1% among men and 34.8% among women. Average scores of clinical symptoms for men and women were 27.62 ± 0.62 and 33.36 ± 0.47 , respectively. Analysis was carried out on the effects of individual dietary patterns and lifestyles on current health status in a 'healthy' group (below the 25 percentile in clinical symptom scores) and an 'unhealthy' group (above the 75 percentile in clinical symptom scores). The results show that the healthy elderly group had relatively good nutrition knowledge, nutrition attitudes, and dietary patterns, ate with family, took nutrition supplements and snacks, and did not smoke. The most 'healthy' group ate out once a month, drank small quantities of alcohol occasionally, and exercised once or twice a week. We believe that the results of this study will be helpful in developing or coordinating plans or programs for improving the health of elderly people.

KEY WORDS: health status, dietary patterns, lifestyle, elderly.

INTRODUCTION

Generally, as people get older, their health status deteriorates. According to a self-evaluation of health conditions reported as part of the 1998 National Health and Nutrition Survey in Korea (98NHNS), 21.9% of surveyed adults over 20 years old considered themselves as unhealthy or very unhealthy, while 43.2% of the elderly surveyed did. The same study also showed that 66% of the elderly had chronic diseases.¹⁾ A survey in 1999 conducted on the status of handicapped people showed that 80 persons out of 1,000 in their 60's and 161 persons out of 1,000 in their 70's were handicapped.²⁾ As chronic degenerative diseases are currently increasing in developing countries as well as in developed countries, new concepts of preventing diseases and promoting health focus on preventing geriatric diseases and accidents, and on improving health-threatening lifestyles and environments.^{3,4)} Realizing the importance of nutrition management in preventing chronic diseases and treating diseases, the Korean

government is now promoting better health for Koreans by changing the emphasis of its health management policies from passive remedial methods to preventive methods such as health education, nutritional improvement and promotion of healthy lifestyles.¹⁾ In this regard, the National Law for Health Promotion was adopted in 1995, and the National Research Program on Health and Nutrition was established by merging the National Research program on Nutrition and the National Research program on Health. Many studies⁵⁻⁷⁾ reported that eating meals regularly is critical in promoting health, nutrition and life expectancy. A survey⁸⁾ in the U.S. on 7,000 men and women showed that there are six healthy habits that can change the aging process: eating regular meals including breakfast, taking a minimum level of, or no, alcohol, sleeping well, no-smoking, regular exercise and eating a healthy diet. The study also showed that men can live an average of eleven more years and women can live an average of seven more years if they implement at least five of these healthy habits, compared to the people who implemented less than three of these habits. Most scientists in the 20th century considered that the physical decline of the elderly was caused by a normal aging process. However, scholars currently report that poor nutrition, sedentary lifestyles, obesity, stress, smoking and excessive

*This study was supported by grants from Wonkwang University.

Accepted : May 7, 2002

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drinking affect the physiological decline of human beings in the latter stages of their lives.⁹

The purpose of the present survey of elderly people in Jeon-ju, studying dietary patterns and lifestyles, and their relations to health status, was to gather information useful in preventing diseases and promoting health for the elderly.

SUBJECTS AND METHODS

1. Subjects

In July and August, 1999, two hundred and thirty elderly people, 73 men (31.7% of the sample) and 157 women (68.3% of the sample), from the colleges and households in Jeon-ju were selected for the study.

2. General characteristics

The subjects were asked questions on sex, age, levels of education, monthly household incomes and the amount of pocket money available.

3. Nutrition knowledge, nutrition attitudes and food habits

The questions on nutrition knowledge and attitudes, and food habits, were developed by reorganizing and supplementing standard forms used for such purposes and by using other documented materials.^{5,10-14} For the ten questions on nutrition knowledge, the total score was ten points, one point each for each right answer and no points for wrong and no answers. For nutrition attitudes questions, the total score was 50 points where one to five points was the scoring scale for each question (Likert scale, the higher the point the better the nutrition attitude is). For food habits, the total was fifteen points based on a scale of one to three points for each of the five questions (the higher the point the better the food habits is). The Cronbach's alpha^{15,16} values for the questions were as follows: 0.69 for nutrition knowledge, 0.67 for nutrition attitude questions, and 0.61 for food habits questions.

4. Smoking, drinking, exercise

Health-related questions consisted of smoking, drinking and exercising habits.

5. Health status

The subjects were asked about the numbers and kinds of chronic diseases they were suffering from. Questions on twenty clinical symptoms were asked based on the

scale of three points: 1 = No; 2 = Sometimes Yes and sometimes No; 3 = Yes) and the Cronbach's alpha score of 0.62 showed a satisfactory reliability.^{15,16} Based on the points received from the questions those above the 75 percentile were classified as unhealthy, and those below the 25 percentile were classified as healthy.

6. Statistical analysis

Statistical analyses of data were undertaken by using the Statistical Package for the Social Sciences (Version 10.0). The qualitative data were tested by the χ^2 -test using cross tabulation analysis with percentages. For the quantitative measurements, the differences between men and women subjects were evaluated by a t-test, and data were expressed as means with their standard errors. In order to determine the relative risk ratios of the 'Unhealthy' group to the 'Healthy' group, based on the points obtained on dietary patterns and lifestyle, the Odds ratios (ORs) were calculated by using Multiple Logistic Regression Analysis.^{15,16}

RESULTS AND DISCUSSION

1. General characteristics

Table 1 shows the general characteristics of the subjects. The subjects were aged from 65 to 79 years old. Male subjects generally achieved a higher education level than women: 83.5% of men completed middle/high school/college, compared to only 44.6% for the women. As for monthly household income, 49.3% of men were in the range of 510,000 to 1,500,000 Won, while 54.3% of

Table 1. General characteristics of the subjects n (%)

	Men n = 73	Women n = 157	Total n = 230	χ^2 -test
Age				
≤ 74	63 (86.3)	144 (91.7)	207 (90.0)	1.63
≥ 75	10 (13.7)	13 (8.3)	23 (10.0)	
Education level				
≤ Elementary school	12 (16.4)	87 (55.4)	99 (43.0)	66.72***
Middle-High school	35 (47.9)	62 (39.5)	88 (38.3)	
≥ College	26 (35.6)	8 (5.1)	43 (18.7)	
Family income (10,000 won)				
≤ 50	21 (28.8)	88 (54.3)	109 (46.4)	16.43**
51 - 150	36 (49.3)	52 (33.1)	88 (38.3)	
151 - 300	14 (19.2)	16 (10.2)	30 (13.0)	
≥ 301	2 (2.7)	1 (0.6)	3 (1.3)	
Available Pocket Money (10,000 won)				
≤ 5	12 (16.4)	49 (30.2)	61 (26.0)	19.08**
6 - 10	23 (31.5)	40 (25.5)	63 (27.4)	
11 - 20	13 (17.8)	37 (23.6)	50 (21.3)	
21 - 30	11 (15.1)	25 (15.9)	36 (15.7)	
≥ 31	14 (19.1)	6 (3.8)	20 (8.7)	

p < 0.01, *p < 0.001 significantly different by χ^2 -test

women were in the range of 500,000 Won or less. As for monthly available pocket money, 31.5% of men were in the range of 60,000 to 100,000 Won, and 30.2% of women were in the range of 50,000 Won or less, showing significant differences between the sexes. Table 1 shows that men have higher levels of education and available pocket money. The '98NHNS¹⁷⁾ survey showed that 53.73% of those surveyed had no education, and that 51.57% had a monthly household income of less than 500,000 Won. The education levels of the subjects in the present study in the Jeon-ju area were higher than those surveyed in '98NHNS; also, the male subjects of the present study had higher monthly household income levels, while the female subjects had similar income levels, compared to those surveyed in '98NHNS. Also, the levels of education and monthly household income of the present subjects in Jeon-ju were higher than those elderly people surveyed in Chongju¹⁸⁾ and Ulsan,¹⁹⁾ but lower than that of those elderly women surveyed in Seoul.²⁰⁾

2. Nutrition knowledge, nutrition attitudes, and food habits

1) Nutrition knowledge

Table 2 presents the ten questions asked regarding nutrition knowledge.¹¹⁾ For question No 2, "An apple and processed apple juice produce the same amount of cellulose" (wrong): 28.8% of men and 41.4% of women answered correctly. For question No 3, "It is good to take less salt" (right): 84.9% of men and 96.2% of women answered correctly, and women obtained higher scores than men. For question No 6, "Too much meats and fishes are harmful to the kidney." (right): 19.2% of men and 33.1% of women answered correctly, and women obtained higher scores than men. For question No 7, "Diabetics should not eat rice" (wrong): 15.1% of men and 3.8% of women answered correctly. For question No 8, "Constipation has nothing to do with health." (wrong): 71.2% of men and 58.0% of women answered correctly.

Table 2. Average score of nutrition knowledge test¹⁾

		Men n = 73	Women n = 157	Total n = 230	n (%)
					χ^2 -test
1. It is no problem on health condition that you much more eat lunch or dinner for not eating breakfast. † 2)??	Correct	16 (21.9)	52 (33.1)	68 (29.6)	4.98
	Incorrect	46 (63.0)	93 (59.2)	139 (60.4)	
	Don't know	11 (15.1)	12 (7.6)	23 (10.0)	
2. An apple and processed apple juice produce the same amount of cellulose. †	Correct	23 (31.5)	53 (33.8)	76 (33.0)	5.93* ⁴⁾
	Incorrect	21 (28.8)	65 (41.4)	86 (37.4)	
	Don't know	29 (39.7)	39 (24.8)	68 (29.6)	
3. It is sood to take less salt.	Correct	62 (84.9)	151 (96.2)	213 (92.6)	9.92**
	Incorrect	4 (5.5)	4 (2.5)	8 (3.5)	
	Don't know	7 (9.6)	2 (1.3)	9 (3.9)	
4. Fishes like mackerel and pacific saury have the same nutritional values as beef.	Correct	25 (34.2)	73 (46.5)	98 (42.6)	3.20
	Incorrect	27 (37.0)	50 (31.8)	77 (33.5)	
	Don't know	21 (28.8)	34 (21.7)	55 (23.9)	
5. Dark green leafy vegetables have better nutrition value than ligher green leafy vegetables.	Correct	51 (69.9)	119 (70.0)	170 (73.9)	0.91
	Incorrect	10 (13.7)	17 (10.8)	27 (11.7)	
	Don't know	12 (16.4)	21 (13.4)	33 (14.3)	
6. Too much meats and fishes are harmful to the kidney.	Correct	14 (19.2)	52 (33.1)	66 (28.7)	20.69***
	Incorrect	35 (47.9)	30 (19.1)	65 (28.3)	
	Don't know	24 (32.9)	75 (47.8)	99 (43.0)	
7. Diabetics should not eat rice. †	Correct	54 (74.0)	143 (91.1)	197 (85.7)	12.69**
	Incorrect	11 (15.1)	6 (3.8)	17 (7.4)	
	Don't know	8 (11.0)	8 (5.1)	16 (7.0)	
8. Constipation has nothing to do with health. †	Correct	10 (13.7)	52 (33.1)	62 (27.0)	10.11**
	Incorrect	52 (71.2)	91 (58.0)	143 (62.2)	
	Don't know	11 (15.1)	14 (8.9)	25 (10.9)	
9. Regardless of exercising, one should eat only less to lose weight. †	Correct	23 (31.5)	67 (43.7)	96 (39.1)	5.78*
	Incorrect	39 (53.4)	86 (51.0)	119 (51.7)	
	Don't know	11 (15.1)	10 (6.4)	21 (9.1)	
10. There is no cholesterol in fruits, vegetables and grains.	Correct	42 (57.5)	92 (58.6)	134 (58.3)	0.62
	Incorrect	13 (17.8)	22 (14.0)	35 (15.2)	
	Don't know	18 (24.7)	43 (27.4)	61 (26.5)	

1) Cronbach α of nutrition knowledge test: Male=0.78, Female=0.61, Total=0.69

2) † : Items are false

3) *p < 0.05, **p < 0.01, ***p < 0.001 significantly different by χ^2 -test

For question No 9, "Regardless of exercising, one should eat only less to lose weight." (wrong): 53.4% of men and 51.0% of women answered correctly. For questions 7, 8 and 9, men obtained higher scores than women. Question number 6. "Too much meats and fishes are harmful for the kidneys." (right), and number 7. "Diabetics should not eat rice." (wrong), returned low rates of the correct answers. These results showed that those surveyed lacked nutrition knowledge of carbohydrates, diabetes and proteins, and there was a slight difference in nutrition knowledge between the sexes.

Table 3 shows the scores obtained in the nutrition knowledge test. On the basis of one point for each right answer for ten questions, no one scored the perfect 10 points. The best score was 9 points, and it was obtained by only two men (2.7%) and four women (2.5%). Three men (4.1%) and two women (1.3%) did not score even

Table 3. Distributions of nutrition knowledge scores¹⁾ of the subjects
n (%)

Scores	Men n = 73	Women n = 157	Total n = 230
0	3 (4.1)	2 (1.3)	5 (2.2)
1	1 (1.4)	1 (0.6)	2 (0.9)
2	3 (4.1)	4 (2.5)	7 (3.0)
3	9 (12.3)	13 (8.3)	22 (9.6)
4	13 (17.8)	25 (15.9)	38 (16.5)
5	12 (16.4)	46 (29.3)	58 (25.2)
6	14 (19.2)	33 (21.0)	47 (20.4)
7	13 (17.8)	21 (13.4)	34 (14.8)
8	3 (4.1)	8 (5.1)	11 (4.8)
9	2 (2.7)	4 (2.5)	6 (2.6)

Mean \pm S.E 4.98 \pm 0.24 5.24 \pm 0.13 5.16 \pm 0.12 t = -1.07^{N.S2)}

1) Nutrition knowledge scores: exact answer is 1, wrong or do not know is 0 point, so the possible total index score is 10 point and high score denote better nutrition knowledge

2) N.S.: Not significant by independent t-test

Table 4. Average score of nutrition attitude test¹⁾

	Men n = 73	Women n = 157	Total n = 230	t-test
1. I don't eat those foods containing ingredients I don't like. ^{†2)}	3.45 \pm 0.11	3.53 \pm 0.07	3.51 \pm 0.09	0.63
2. I like food to be cooked in a variety of ways.	2.75 \pm 0.13	2.45 \pm 0.07	2.55 \pm 0.09	2.18 ^{*4)}
3. I think that food habits should be flexible.	2.42 \pm 0.11	2.54 \pm 0.07	2.50 \pm 0.09	-0.91
4. I like my family recipes, but will accept other recipes.	2.00 \pm 0.05	2.13 \pm 0.05	2.09 \pm 0.05	-1.65
5. I'm very much interested in nutrition and health information.	2.18 \pm 0.10	2.18 \pm 0.06	2.18 \pm 0.08	-0.002
6. I have no reason to change what I like to eat. [†]	3.64 \pm 0.10	3.51 \pm 0.07	3.55 \pm 0.08	1.08
7. I believe that nutrition influence one's health.	1.86 \pm 0.07	1.99 \pm 0.04	1.95 \pm 0.05	-1.56
8. Eating whatever I want to eat as much as I can is more important than nutrition. [†]	2.94 \pm 0.13	2.88 \pm 0.08	2.90 \pm 0.10	0.40
9. For better health, I would be willing to try food that I hadn't eaten before.	2.34 \pm 0.01	2.38 \pm 0.07	2.37 \pm 0.09	-0.26
10. Trying new and different foods appeals to me.	2.32 \pm 0.09	2.45 \pm 0.07	2.40 \pm 0.08	-1.08
Total ³⁾	25.92 \pm 0.39	26.04 \pm 0.26	26.00 \pm 0.03	-0.26

Mean \pm S.E

1) Cronbach α of nutrition attitude test: Men=0.65, Women=0.67, Total=0.67

2) [†]: Items that were reversed for scoring

3) Nutrition attitude scores (1-5) high score denote better nutrition attitude, so the possible total index score is 50.

4) *p < 0.05 significantly different by independent t-test

one point. The average scores were 4.98 \pm 0.24 for men and 5.24 \pm 0.13 for women, and there were no significant differences between the sexes. The results of this study revealed that the present subjects had similar average scores compared to those elderly people surveyed in Sungju²¹⁾ (scores of 4.7 for men and 4.1 for women), but lower average scores compared to a survey in Seoul.²²⁾

2) Nutrition attitudes

As shown in Table 4, attitudes on foods and nutrition were assessed by assigning one to five points for each of ten questions asked (maximum 50 points), and it was assumed that the higher the score achieved, the easier it would be to favorably redirect the dietary patterns of the subjects. High scores were obtained in some questions such as No.1. "I don't eat those foods containing ingredients I don't like" (men 3.45 \pm 0.11, Women 3.53 \pm 0.07); No.6. "I have no reason to change what I like to eat." (men 3.64 \pm 0.10, Women 3.51 \pm 0.07); and No.4. "I like my family recipes, but will accept other recipes." (men 2.00 \pm 0.05, Women 2.13 \pm 0.05). This revealed that those surveyed do not have strong opinions on health and nutrition, and although he or she can be flexible in choosing recipes and foods, this flexibility is reduced if his/her family is involved in such choice. For question No.2. "I like food to be cooked in a variety of ways." men scored 2.75 \pm 0.13 and women scored 2.45 \pm 0.07, showing that men prefer food to be cooked in a variety of ways, compared to women. The average scores for nutrition attitudes for men and women were 25.92 \pm 0.9 and 26.04 \pm 0.26 respectively, showing no significant difference.

Table 5. Food habits of the subjects

	Men n=73	Women n = 157	Total n = 230	n (%)
Regularity of breakfast				χ^2 -test
Irregular (0 - 1 times/week)	1 (1.4)	12 (7.6)	13 (5.7)	4.13
Frequently (2 - 5times/week)	5 (6.8)	14 (8.9)	19 (8.3)	
Regular (6 - 7times/week)	67 (91.8)	131 (83.4)	198 (86.1)	
Regularity of meal time				10.08**1)
Irregular	7 (9.6)	44 (28.0)	51 (22.2)	
Frequently	1 (1.4)	3 (1.9)	4 (1.7)	
Regular	65 (89.0)	110 (70.1)	175 (76.1)	
Amount of food eaten				0.90
Excess	7 (9.6)	21 (13.4)	28 (12.1)	
Moderate	52 (71.2)	111 (70.7)	163 (70.9)	
Not enough	14 (19.2)	25 (15.9)	39 (17.0)	
Usage of salt or soybean sauce at the table				4.89
Yes	12 (16.4)	28 (17.8)	40 (17.4)	
Sometimes	56 (76.7)	102 (65.0)	158 (68.7)	
No	5 (6.9)	27 (17.2)	32 (13.9)	
I used to eat lightly salted food				0.73
Yes	2 (2.7)	2 (1.2)	41 (1.7)	
Sometimes	36 (49.3)	75 (47.8)	111 (48.3)	
No	35 (48.0)	80 (51.0)	115 (50.0)	
Total ²⁾	11.25 \pm 0.15 ³⁾	10.70 \pm 0.12	10.87 \pm 0.13	2.63**3)

Mean \pm S.E1) **p < 0.01 significantly different by χ^2 -test

2) Food habit scores (1 - 3): The possible total index score is 15 and high score denote desirable food habit

3) *p < 0.01 significantly different by independent t-test

3) Food habits

Five questions to evaluate food habits are presented in Table 5. For regularity of taking breakfast, 91.8% of men and 83.4% of women were taking this meal regularly, 6.8% of men and 8.9% of women were taking it "sometimes", and 1.4% of men and 7.6% of women were taking it irregularly; no significant differences were found between the sexes, but more women ate breakfast irregularly than men did. The rate of skipping breakfast (sometimes) of those surveyed was 5.7%, and it was higher than that of those surveyed in '98NHNS which was 4.6%. For regularity of having three meals, 9.6% of men and 28.0% of women answered "irregular", and 89.0% of men and 70.1% of women answered "regular". This showed that more women take meals irregularly than men do. The rate for those men and women who take meals irregularly was 22.2%; this is lower than the 34.9% obtained in a similar study carried out in Chongju,¹⁸⁾ but it is higher than the 16.9% obtained in '98NHNS²³⁾ and the 13.4% obtained for those women surveyed in Seoul.³⁴⁾ Taking regular meals along with no-drinking, no-smoking and taking regular exercises is considered a healthy lifestyle; also, taking regular meals is important to improve health and lengthen life expectancy.^{5,7)} As for the quantity of meals, 9.6% of men and 13.4% of women responded that

they ate too much, 71.2% of men and 70.7% of women ate "normal" amounts and 19.2% of men and 15.9% ate less than they wanted to eat.

Regarding the additional use of salt or soy bean sauce at the table, 16.4% of men and 17.8% of women said "yes", 76.7% of men and 65.0% of women said "sometimes", and 6.8% of men and 17.2% of women said "no". This shows no significant differences between the sexes, but it shows that the number of men who use additional salt (or soy bean sauce) at the table when they eat is double the number of men who don't. As to the question "Do you eat with less salt?", 2.7% of men and 1.3% of women said "yes", 49.3% of men and 47.8% of women said "sometimes" and 47.9% of men and 51.6% of women said "no". This shows that more than half of those surveyed think they can't eat without salt since their senses of taste become dull as they get older and they prefer salty food; this result is similar to the results found from other studies.²⁵⁾ From a total possible individual points score for all the food habits questions (the higher the points, the better the food habit), average points were 11.25 \pm 0.15 for men and 10.70 \pm 0.12 for women.

4) Meal patterns and nutrition (food) supplements

Table 6 presents the meal patterns and nutrition sup-

Table 6. Meal patterns and health food or supplements of the subjects

	Men n = 73	Women n = 157	Total n = 230	n (%)
Frequency of meal				χ^2 -test or Fisher's Exact-test
2 times	3 (4.1)	17 (10.8)	20 (8.7)	2.83
3 times	70 (95.9)	140 (89.2)	210 (91.3)	
Person who prepares food				166.42**** ¹⁾
Self	4 (5.5)	134 (85.4)	138 (60.0)	
Spouse	63 (86.3)	6 (3.8)	69 (30.0)	
Children	2 (2.7)	7 (4.5)	9 (3.9)	
Other	4 (5.5)	10 (6.4)	14 (6.1)	
Person who effects menu				36.91***
Self	16 (21.9)	89 (56.7)	107 (45.7)	
Spouse	51 (69.9)	44 (28.0)	95 (41.3)	
Children	3 (4.1)	17 (10.8)	20 (8.7)	
Other	3 (4.1)	7 (4.5)	10 (4.3)	
Person with whom he/she has a breakfast				30.46***
Alone	2 (2.7)	57 (36.3)	59 (25.7)	
With spouse	49 (67.1)	62 (39.5)	111 (48.3)	
With family	21 (28.8)	36 (22.9)	57 (24.8)	
Other	1 (1.4)	2 (1.3)	3 (1.3)	
Person with whom he/she has a dinner				29.67***
Alone	1 (1.4)	51 (32.5)	52 (22.6)	
With spouse	53 (72.6)	69 (43.9)	122 (53.0)	
With family	18 (24.7)	33 (21.0)	51 (22.2)	
Other	1 (1.4)	4 (2.5)	5 (2.2)	
Taking health aid foods or supplements				0.25
Yes	36 (49.3)	83 (52.9)	119 (51.7)	
No	37 (50.7)	74 (47.1)	111 (48.3)	
Type of health aid foods or supplements ²⁾				
Vitamin supplement	27 (43.5)	48 (42.5)	75 (40.9)	
Mineral supplement	8 (12.9)	22 (19.5)	30 (17.1)	
Health foods	12 (19.4)	20 (17.7)	32 (18.3)	
Chinese medicine	8 (12.9)	14 (12.4)	22 (18.3)	
Others	7 (11.3)	9 (8.0)	16 (9.1)	
Subtotals	62 (100)	113 (100)	175 (100)	

1) ***p < 0.001 significantly different by χ^2 -test

2) multiple response

plement behaviors of the subjects. As to the number of meals per day, 95.9% of men and 89.2% of women had "three meals" and 4.1% of men and 10.8% of women had "two meals". There were no significant differences between the sexes but twice as many women as men said they eat two meals a day. This result supports the related finding, were other meals discussed above, which showed more women took breakfast and other meals irregularly than men did. For the total sample, 8.7% of respondents said they eat two meals a day; this is about six times higher than the 1.5% obtained in '98NHNS²³⁾ survey.

As to the question, "Whom do you eat with?", 67.1% of men and 39.5% of women ate with "spouse"; 28.8% of men and 22.9% of women ate with "family"; and 2.7% of men and 36.3% of women said "alone" (p < 0.001). For the question, "Whom do you eat dinner with?", 1.4% of men and 32.5% of women said "alone"; 72.6% of men

and 43.9% of women said "spouse"; and 24.7% of men and 21.0% of women said "family" (p < 0.001). This shows that, for dinner, less eat alone and more eat with their spouses, compared to breakfast. However, this still shows that 36.3% of women eat breakfast and 32.5% of women eat dinner alone. As for the intake of nutrition supplements, 49.3% of men and 52.9% of women said "yes", and 50.7% of men and 47.1% of women said "no". For those surveyed in '98NHNS,²³⁾ 22.2% said "yes" and that is lower than the result of this study and lower than that of those surveyed in Seoul.²⁰⁾

5) Snacks and eating out

Table 7 shows the results concerning frequencies and kinds of snacks and eating-outs. With regards to taking snacks, 24.7% of men and 46.5% of women said "everyday", and this accounted for 39.6% of the total respondents;

Table 7. Snack patterns and eating out of the subjects

	Men n = 73	Women n = 157	Total n = 230	n (%)
Snack				
Frequency				
Everyday	18 (24.7)	73 (46.5)	91 (39.6)	10.49*** ¹⁾
Sometimes	36 (49.3)	50 (31.8)	86 (37.4)	
Rarely	19 (26.0)	34 (21.7)	53 (23.0)	
Time				
Before breakfast	2 (3.7)	1 (0.8)	3 (1.6)	2.89
Between breakfast and lunch	10 (18.5)	32 (26.0)	42 (23.7)	
Between lunch and dinner	32 (59.3)	74 (60.2)	106 (59.9)	
After dinner	10 (18.5)	16 (13.0)	26 (14.7)	
Subtotal	54 (100)	123 (100)	177 (100)	
Kinds ^{§2)}				
Fruits	43 (63.2)	104 (68.0)	147 (66.5)	
Bread, cookie, rice cake	11 (16.2)	25 (16.3)	36 (16.3)	
Juice, drink, coffee, tea	11 (16.2)	18 (11.7)	29 (13.1)	
Others	3 (4.4)	6 (3.9)	9 (4.1)	
Subtotal	68 (100)	153 (100)	221 (100)	
Eating out.				
Frequency				
> 1 times/day	14 (19.2)	4 (2.5)	18 (7.8)	31.58***
> 1 times/week	24 (32.9)	26 (16.6)	50 (21.7)	
> 1 times/month	23 (31.5)	60 (38.2)	83 (36.1)	
Rarely	12 (16.4)	67 (42.7)	79 (34.3)	
Kinds [§]				
Korean style	53 (86.9)	77 (80.2)	130 (82.3)	
Chinese style	4 (6.6)	5 (5.2)	9 (5.7)	
Western style	0 (0.0)	1 (1.0)	1 (0.6)	
Japanese style	2 (3.3)	1 (1.0)	3 (1.9)	
Noodle	1 (1.6)	9 (9.4)	10 (6.3)	
Others	1 (1.6)	3 (3.1)	5 (3.2)	
Subtotal	61 (100)	96 (100)	158 (100)	

1) **p < 0.01, ***p < 0.001 significantly different by χ^2 -test

2) §: multiple response

women were found to take more snacks than men do. The rate of taking snacks (one to three times a day) for those surveyed in '98NHNS²³⁾ was 61.2%, which was higher than the result of the present study. As for eating-out, 16.4% of men and 42.7% of women answered "seldom" and this accounted for 34.4% of the total surveyed; men were found to eat-out more than women do ($p < 0.001$). For those surveyed in '98NHNS²³⁾ 68% said "seldom", which is much higher than the 34.4% found in this study.

3. Health-related habits

For those surveyed, 23.3% of men and 3.2% of women were smokers, 21.9% of men and 3.8% of women were ex-smokers, and 54.8% of men and 93.0% of women were non-smokers ($p < 0.001$) (Table 8); this shows that women smoked less than men did. Fifty-three percent of men smoker smoked 10–20 cigarettes a day. Sixty per-

cent of women smokers smoked 10 cigarettes or less a day, and the majority had been smoking for 20 to 30 years. For those surveyed in '98NHNS²³⁾ 51.9% of men and 14.9% of women were smokers (continuous and occasional smokers). The smoking rate of those surveyed in the present study was lower than that of those surveyed in Chungju¹⁸⁾ where 48.4% of men and 21.8% of women smoked. For the present study, 31.5% of men and 10.8% of women said they drank; 21.9% of men and 5.1% of women said they had stopped drinking; and 46.6% of men and 84.1% of women said they had never drunk ($p < 0.001$). As for the frequency of drinking, the majority of men (52.2%) said they drink one to three times a week, and the majority of women (76.5%) said they drink two to three times a month. As for the quantity of drinks, 34.8% of men and 52.9% of women said they drank one glass or less each time. For those surveyed in '98NHNS²³⁾

Table 8. Smoking, drinking of the subjects

	Men n = 73	Women n = 157	Total n = 230	χ^2 -test	n (%)
Smoking					
Current smoker	17 (23.3)	5 (3.2)	22 (9.5)	47.10*** ¹⁾	
Ex-smoker	16 (21.9)	6 (3.8)	22 (9.5)		
No-smoker	40 (54.8)	146 (93.0)	186 (80.9)		
Numbers of cigarettes/day					
< 10	2 (11.8)	3 (60.0)	5 (22.7)	5.85	
10 - 20	9 (52.9)	2 (40.0)	11 (50.0)		
> 20	6 (35.3)	0 (0.)	6 (27.3)		
Subtotal	17 (100)	5 (100)	22 (100)		
Duration/years					
< 20	1 (5.9)	1 (20.0)	2 (9.1)	1.80	
20 - 30	12 (70.6)	2 (40.0)	14 (63.6)		
> 30	4 (23.5)	2 (40.0)	6 (27.3)		
Subtotal	17 (100)	5 (100)	22 (100)		
Drinking					
Drinker	23 (31.5)	17 (10.8)	40 (17.4)	37.24***	
Abstainer	16 (21.9)	8 (5.1)	24 (10.4)		
Non-drinker	34 (46.6)	132 (84.1)	166 (72.2)		
Frequency of drinking					
2 - 3/month	7 (30.4)	13 (76.5)	20 (50.0)	8.83*	
1 - 3/week	12 (52.2)	3 (17.6)	15 (37.5)		
4 - 5/week	2 (8.7)	1 (5.9)	3 (7.5)		
Everyday	2 (8.7)	0 (0)	2 (5.0)		
Subtotal	23 (100)	17 (100)	40 (100)		
Amount of drink (soju) at once					
< 1	8 (34.8)	9 (52.9)	17 (42.5)	4.03	
2 - 1	6 (26.1)	6 (35.3)	12 (30.0)		
4 - 3	7 (30.4)	2 (11.8)	9 (22.5)		
≥ 5	2 (8.7)	0 (0.0)	2 (5.0)		
Subtotal	23 (100)	17 (100)	40 (100)		

1) *p < 0.05, ***p < 0.001 significantly different by χ^2 -test

46.7% of men and 13.5% of women said they drank. The drinking rate of the present subjects surveyed in the Jeonju area was lower than that of those surveyed in Chungju¹⁸⁾ where 42.9% of men and 21.8% of women said they drank.

More men than women undertook regular exercise: 67.1% of men compared to 34.8% of women (p < 0.001) (Table 9). Out of those who exercised, the majority for both sexes said they exercised three or more times a week and walked thirty minutes to an hour per day. For those who exercised, 52.1% of men and 30.6% of women said they exercised enough; this shows a significant difference in opinion between men and women. In the '98NHNS survey where only 8.7% of men and 3.8% of women said they exercised, the rate of exercise was much lower than that of the subjects of the present study in Jeonju. For those surveyed in Chungju,¹⁸⁾ men showed similar and women showed higher rates of exercise (61.5% of men and 41.0% of women) compared to the present study. The subjects of the present study showed lower

Table 9. Exercise of the subjects

	Men n = 73	Women N = 157	Total N = 230	χ^2 -test
Exercise				
Frequency of exercise				
≥ 3 /week	23 (31.5)	28 (17.9)	51 (22.2)	23.08*** ¹⁾
1 - 2/week	21 (28.8)	19 (12.1)	40 (17.4)	
1 - 3/month	5 (6.8)	6 (3.8)	11 (4.8)	
No	24 (32.9)	104 (66.2)	128 (55.7)	
Time of walking/day				
> 2hours	7 (9.6)	22 (14.0)	29 (12.9)	2.12
1 - 2hours	21 (28.8)	34 (21.7)	55 (23.9)	
30 mins-1hour	19 (36.0)	46 (29.3)	65 (28.3)	
10 - 30 mins	20 (27.4)	44 (28.0)	64 (27.8)	
< 10 mins	6 (8.2)	11 (7.0)	17 (7.4)	
Volume of exercise				
Full	38 (52.1)	48 (30.6)	86 (37.4)	9.65**
Little	35 (47.9)	102 (69.6)	134 (62.6)	

1) ***p < 0.01, ****p < 0.001 significantly different by χ^2 -test

rates of smoking and drinking and higher exercise rates, compared to those surveyed in '98NHNS. It appears that the subjects of the present study paid more attention to

Table 10. Clinical symptoms¹⁾ of the subjects

	Men n = 73	Women n = 157	Total n = 230	t-test
Amblyopia	1.96 ± 0.09	2.34 ± 0.05	2.22 ± 0.05	- 3.71*** ²⁾
Teeth problem	1.90 ± 0.09	2.04 ± 0.07	2.00 ± 0.06	- 1.15
Forgetfulness	1.74 ± 0.08	2.29 ± 0.06	2.12 ± 0.05	- 5.68***
Night enuresis	1.74 ± 0.09	2.05 ± 0.07	1.95 ± 0.05	- 2.65**
Difficulty on hearing	1.66 ± 0.09	1.78 ± 0.06	1.73 ± 0.05	- 0.96
Articular pain	1.62 ± 0.09	2.11 ± 0.06	1.96 ± 0.05	- 4.43***
Irritation	1.42 ± 0.08	1.94 ± 0.06	1.78 ± 0.05	- 4.78***
Constipation	1.38 ± 0.07	1.35 ± 0.05	1.36 ± 0.03	0.37
Sputa	1.36 ± 0.06	1.37 ± 0.05	1.36 ± 0.04	- 0.02
Weakness	1.33 ± 0.07	1.88 ± 0.07	1.70 ± 0.05	- 4.96***
Coughing	1.27 ± 0.07	1.36 ± 0.05	1.33 ± 0.04	- 0.92
Headache	1.23 ± 0.06	1.78 ± 0.05	1.62 ± 0.04	- 6.44***
Indigestion	1.23 ± 0.06	1.59 ± 0.06	1.48 ± 0.05	- 3.68***
Asthma	1.15 ± 0.05	1.39 ± 0.05	1.31 ± 0.04	- 2.75**
Insomnia	1.19 ± 0.05	1.65 ± 0.06	1.51 ± 0.05	- 4.82***
Depression	1.18 ± 0.05	1.53 ± 0.05	1.42 ± 0.04	- 4.14***
Palpitation	1.14 ± 0.05	1.73 ± 0.06	1.55 ± 0.05	- 7.93***
Tremor of the hands	1.11 ± 0.05	1.19 ± 0.04	1.16 ± 0.03	- 1.30
Fracture	1.10 ± 0.04	1.32 ± 0.04	1.24 ± 0.03	- 3.75***
Change of voice	1.07 ± 0.03	1.30 ± 0.04	1.23 ± 0.03	- 3.54**
Total	27.64 ± 0.62	33.36 ± 0.47	32.03 ± 0.64	- 7.58***

Mean ± S.E

1) Clinical symptom scores (1 – 3): The possible total index score is 60 so high score denote bad health condition.

2) **p < 0.01, ***p < 0.001 significantly different by independent t-test

health than those surveyed in other studies.

4. Health status

As shown in Table 10, clinical symptoms²⁴⁾ including the rate of dental problems were assessed by assigning between one and three points to each of twenty questions related to twenty clinical symptoms; this was based on the scale of (1 = No; 2 = Sometimes Yes, sometimes No; and 3 = Yes). assuming that the higher the scores, the unhealthier the subjects. For both men and women, highest points were seen in amblyopia. The clinical symptoms that showed high scores were similar for men and women. For men, the most frequent symptoms in order of importance were dental problems, difficulty of hearing, forgetfulness, and night enuresis; for women the most frequent symptoms in order of importance were forgetfulness, articular pain, night enuresis and dental problems. Among the clinical symptoms, no significant differences between the sexes were found in dental problems, difficulty of hearing, constipation, sputa, coughing and tremor of the hands. However, women had in general higher points on other clinical symptoms. This shows that more women were suffering from clinical symptoms than men. There were significant differences between men and women, as men scored 27.64 ± 0.62 and women scored 33.36 ± 0.47, showing that women scored 6 points high-

Table 11. Odds ratio of health condition¹⁾ according to the NKS²⁾, NAS³⁾ and FHS⁴⁾

	OR ⁵⁾	95% CI ⁶⁾
NKS	0.88	0.68 – 1.15
NAS	0.92	0.79 – 1.07
FHS	0.81	0.58 – 1.12

1) Classified with quartile according to Clinic symptoms score level of Healthy group means low 25% in points over and Unhealthy group means high 75% in points

2) NKS: Nutrition Knowledge Score

3) NAS: Nutrition Attitude Score

4) FHS: Food Habit Score

5) Adjusted for sex

6) 95% confidence interval

er than men (p < 0.001). For those surveyed in Chungju,²⁶⁾ the results were similar to those obtained in the present study; more women had diseases and suffered from clinical symptoms than men did.

5. Effects of dietary patterns and lifestyle on health

Table 11 shows the results of the analysis on the effects of nutrition knowledge, nutrition attitudes and food habits on the health of the two groups: the healthy group (below 25 percentile in clinical symptoms) and the unhealthy group (above 75 percentile in clinical symptoms). Although there were no significant differences, it appeared that those with better nutrition knowledge, nutrition at-

Table 12. Odds ratio of health condition¹⁾ according to the dietary patterns

	OR ²⁾	95% CI ³⁾
Frequency of meal		
2 times	1.18	0.9 – 7.38
3 times	1.00	
Person with whom he/she has a dinner		
Alone	2.63	0.59 – 11.73
With spouse	1.64	0.34 – 7.69
With family	1.00	
Taking health aid foods or supplements		
No	2.64	0.88 – 7.36
Yes	1.00	
Frequency of snack		
Everyday	0.60	0.14 – 2.51
Sometimes	0.95	0.24 – 3.75
Rarely	1.00	
Frequency of eating-out		
> 1/week	0.63	0.22 – 1.80
> 1/month	0.08	0.02 – 0.28
Rarely	1.00	

1) Classified with quartile according to Clinic symptoms score level of Healthy group means low 25% in points over and Unhealthy group means high 75% in points

2) Adjusted for sex

3) 95% confidence interval

titudes, and more flexible food habits were more healthy as the Odds Ratios (OR) for each characteristic were less than one: specifically, 0.88 (95% Confidence Interval (CI) 0.68 – 1.15) for nutrition knowledge, 0.92 (95% CI 0.79 – 1.07) for nutrition attitudes, and 0.81 (95% CI 0.58 – 1.12) for dietary patterns.

Table 12 shows the effects of other dietary patterns on health. It shows that those who take three meals a day had a lower risk of bad health than those who take two meals a day (OR = 1.18, 95% CI 0.90 – 7.38) and those who eat meals with families (OR = 1) had a lower risk of bad health than those who eat meals with spouses (OR = 1.64, 95% CI 0.34 – 7.69) or alone (OR = 2.63, 95% CI 0.59 – 11.73). This corresponds with similar results from other research reporting that taking regular meals is good for health⁵⁻⁷⁾ and that those elderly people who eat alone have more depression.²⁷⁾ It was also shown in the present study that those who did not take nutrition supplements (OR = 2.64, 95% CI 0.88 – 7.36) had a higher risk of bad health than those who did (OR = 1), and those who take snacks sometimes (OR = 0.95, 95% CI 0.24 – 3.75) and almost everyday (OR = 0.60, 95% CI 0.14 – 2.51) had a lower risk of bad health than those who seldom did (OR = 1). But, these differences were not significant. The results of the present study further showed that those who eat out at least once a week (OR = 0.08, 95% CI 0.02 – 0.28) had a significantly lower risk of bad health

Table 13. Odds ratio of health condition¹⁾ according to the health-related habits

	OR ²⁾	95% CI ³⁾
Smoking		
Current smoker	2.55	0.28 – 22.91
Ex-smoker	10.65	0.98 – 115.99
No-smoker	1.00	
Drinking		
Current drinker	0.61	0.19 – 2.01
Ex-drinker	0.82	0.15 – 4.62
No-drinker	1.00	
Exercise		
> 1/week	0.47	0.15 – 1.42
1 – 2/week	0.35	0.08 – 1.44
1 – 3/month	0.31	0.05 – 2.16
No	1.00	

1) Classified with quartile according to Clinic symptoms score level of Healthy group means low 25% in points over and Unhealthy group means high 75% in points

2) Adjusted for sex

3) 95% confidence interval

than those who seldom did (OR = 1), even though there were no significant differences.

Table 13 relates the effects of smoking, drinking and exercise on health. Those who quit smoking (OR = 10.65, 95% CI 0.98 – 115.99) or smoke (OR = 2.55, 95% CI 0.28 – 22.91) had a higher risk of bad health than non-smokers (OR = 1), but there were no significant differences. It is known that smoking causes more than 80% of lung cancer and chronic lung diseases, and about 30% of all kinds of cancer.²⁸⁾ It is also known that the history of smoking for thirty years increases the possibility of lung cancer by about 0.1% annually. A history of smoking for forty five years increases the possibility of lung cancer by about 0.5% annually and causes many circulatory and bone diseases.²⁹⁻³¹⁾ Those who quit drinking (OR = 0.82, 95% CI 0.15 – 4.62) had a lower risk of bad health than those who did not drink (OR = 1), but there were no significant differences. But those who drank (OR = 0.61, 95% CI 1.19 – 2.01) had a significantly lower risk of bad health. Excessive drinking of alcohol causes liver diseases^{32,33)} and increases the risk of mouth, throat, esophagus, liver, breast and rectum cancers.^{34,35)} It was also known that excessive drinking affects nutrition by interrupting the absorption and metabolism of nutrients, and by causing this elevates the risks of nutrient deficiencies even for those who take regular and balanced meals.^{36,37)} On the contrary, Simons *et al*³⁸⁾ reported that through their fourteen-years of extensive research, they have shown that drinking one to seven glasses of alcohol a week will lengthen life expectancy for the elderly. Moreover, Jeromes *et al*³⁵⁾ stated that those who drink a-

bout 1–20 glasses a month have 79% and those who drink 21–70 glasses a month have 53% lower probabilities of cardiac infarction, compared to those who don't drink. However, Ralph *et al*⁴⁰ reported that those who drink less than two glasses a day after treatment for heart diseases, hypertension, diabetes, smoking habits and obesity have a 51% lower rate of heart disease; also, those who drink more than seven glasses a day after such treatment have about three times more risk of heart disease. After more than eleven years of research on Danish men and women, Gronbaek *et al*⁴¹ suggested that the drinking of alcohol and death rates have a U type or J type relationship. For those surveyed in this study, the majority of men (34.8%) and women (52.9%) said they drink less than a glass at a time; this compares to the results from other research which showed that drinking small quantities of alcohol can be good for health. As for exercise, those who exercised more than three times a week (OR = 0.47, 95% CI 0.15–1.42) and one to three times a month (OR = 0.31, 95% CI 0.05–2.16) had a lower risk of bad health than those who did not (OR = 1), but these differences were not significant. Those who exercised once or twice a week (OR = 0.35, 95% CI 0.08–0.44) were found to have a significantly lower risk of bad health. This means it is good for the elderly to exercise on a regular basis to improve appetite and heart functions, to increase muscular strength and suppleness of body, to maintain healthy bones and weight, and to cope with depression.^{42,43}

The results show that the healthy elderly group had relatively good nutrition knowledge, nutrition attitudes, and dietary patterns, ate with family, took nutrition supplements and snacks, and did not smoke.

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