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A Survey on Korean Families' Food Decision Making: I. Purchase of Fresh Fruits and Vegetables

Dong-Yean Park†, Seung-Gyo Rhie and Ardyth H. Gillespie

Department of Home Economics Education, Dongguk University, Gyeongju 780-714, Korea
Department of Food and Nutrition, Suwon University, Suwon 445-743, Korea
Division of Nutritional Science, Cornell University, Ithaca, New York 14853, USA

Abstract

A survey on Korean families' purchase of fresh fruits and vegetables was conducted to increase understanding of families' food decision making. Two hundred ninety seven families with at least one elementary-school age child were selected from four elementary schools to complete a questionnaire during April, 2001 in Gyeongju, Korea. Descriptive statistics, Chi-square test, T-test, and ANOVA statistics were used to analyze the data. The major findings are as follows: Families bought fresh fruits and vegetables at the public markets or the farmer's markets and a large supermarket most frequently in both summer and winter. Families grew produce by themselves and bought them from farmers directly least frequently in both summer and winter. Families whose housewives had less than middle school education bought fruits and vegetables from Agricultural Co-ops and grew them by themselves more frequently compared to those who had higher education. On the other hand, families whose housewives had graduated from 4 year college bought fruits and vegetables from large supermarkets more frequently compared to those who had lesser education. "Quality" and "safety production" of fruits and vegetables and "clean environment of store" were the three most important factors when they decided the place to buy fruits and vegetables. "Being treated as a valuable customer" and "ease of finding things" were the two least important factors. Families whose housewives were in their thirties valued "cleanness of the store" and "being treated as a valuable customer" important factors when they decided the place. Families whose housewives had less than middle school education thought that price, availability of public transportation, and availability of locally grown food were the important factors for deciding the place compared to those who had higher education. The price was the factor which low-income families thought important for decision making on the place to buy fruits and vegetables.

Key words: purchase, fruit, vegetable, family

INTRODUCTION

The pattern of Koreans' food intake has changed markedly since the 1970s along with economic development. The intake of animal food has increased and that of plant food has decreased during last three decades (1,2). Intake of dietary fiber per person also has decreased accompanied with the decrease of consumption of plant foods. According to Lee et al.'s (3) report which estimated intake of dietary fiber with the Annual Reports of Korean National Nutrition Survey, the mean daily intake of dietary fiber per person had decreased from 24.5 g in 1969 to 17.3 g in 1990. Lee et al. (4) reported that college students, who lived in large cities, consumed 15.2 g of dietary fiber per day. Compared with the recommended dietary allowance of 20~25 g per day for Korean, the average intake of dietary fiber was not within the normal range. The source of dietary fiber has also changed during the last thirty years. Fiber intake from cereals has decreased gradually and that from vegetables has a tendency to be constant. However, within the vegetable group, fiber intake from fresh vegetables has decreased and that from processed vegetables has increased. The death rate from cancer of the colon, pancreas, breast, and prostate, and diabetes has increased during the last decade (5). This is attributed to such a change of food intake in the Korean population. (6,7) Therefore, an increased intake of fresh fruits and vegetables is needed to benefit Koreans' health.

Korea has been forced to open an agricultural market according to the introduction of the World Trade Organization system. Korean farmers are not ready to compete with the international agricultural market because the Korean government has concentrated on industrial development for the last three decades, so that agriculture has

†Corresponding author. E-mail: pdy@mail.dongguk.ac.kr
Phone: 82-54-770-2267, Fax: 82-54-770-2527
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fallen far behind compared to other industries. Items which have been forced onto the international market are the ones which would have given more income to farmers compared to others. However, Korean farmers are unable to compete price-wise with imported products. Therefore, farmers have suffered loss and felt economic depression with relative poverty (8). On the other hand, due to a change of life style, food preference, and purchasing power of Korean consumers, there are increased demands for high quality and a wide variety of fresh fruits and vegetables (9).

Supplies of fresh fruits and vegetables from the farm to customers in adjacent cities would be of benefit to both farmers and customers. For farmers, they could have a better deal because they could supply fresh fruits and vegetables and reduce the expense of distribution. For customers, they could get fresh fruits and vegetables for a reasonable price because of the short distance of distribution. If farmers and customers had a chance to trade directly, their benefit would be greater. Direct selling by farm producers also could reduce harmful environmental side-effects (10). Therefore, it should be encouraged.

In order to increase customers' intake of fresh fruits and vegetables and farmers' benefit from selling fresh fruits and vegetables, obtaining information about customers' decision making on the purchase of fresh fruits and vegetables is very important. The family is an important unit for studying food behaviors because most food decision making happens within the context of the family. We have emphasized families with children as a segment of the population for whom changes in dietary habit would have the most significant long-term public health impact and where changes in food behavior are already occurring as families progress through a life-cycle of developmental changes. In this study, we define "family" inclusively as "any configuration of people who regularly eat together, or from the same household resources, and who mutually influence decisions about food" (11).

There is little research on decision making about fruits and vegetables in Korea. Jin (1) reported on housewives's attitudes and behaviors related to fruits and vegetables in the small city. Kang & Chung (12) surveyed housewives' consumption pattern and nutrition knowledge about vegetables. To develop family capacity for improving food and nutrition behaviors utilizing locally and regionally produced fruits and vegetables, we investigated current families' food decision making about fresh fruits and vegetables in Gyeongju, Korea. In this paper, we report on families' purchasing behavior about fresh fruits and vegetables as one part of our food decision making research with the families which had at least one elementary-school age child.

METHODS

Study families

Study families were the families which had at least one elementary-school age child. Four elementary schools, Youlim, Gyeongju, Seorabeol, and Dongbang, were chosen in Gyeongju, Korea. The schools were selected purposely so that the entire sample was expected to represent families with a range of income and educational levels. Students of one classroom from the first, third, and fifth grade classrooms in each school were selected in which the questionnaires were distributed. Before collecting data, the purpose of the research was explained to the teachers and teachers' cooperation for data collection was obtained. Students took questionnaires home and brought them back to school within a week. Housewives were asked to answer the questionnaires. Two hundred ninety seven families with at least one elementary-school age child responded during April 2001.

Questionnaires

Development of the questionnaires : The questionnaire was mainly developed from the one used in a Gillespie's (13) study of Rochester Community Plant Food Project in USA and modified to fit into Korean culture. Exploratory interviews with open-ended questionnaires were conducted with nine families similar to the families in the intended study sample in order to see whether the draft questions covered significant areas of questioning and to find areas which were important to the samples but were not reflected in the questionnaire. Questions in the exploratory interviews were asked orally without multiple choice responses. After the initial development, the questionnaire was pilot tested with twenty eight families. During this process, they were asked to identify any words or questions that were unclear. Through pilot testing and revision, the final questionnaire was established.

The content of the questionnaire : The original questionnaire obtained general information about the household and several factors affecting food decision making for families. We used the general information about the household, frequency of intake of fresh fruits and vegetables, place of buying fruits and vegetables, and factors affecting the decision of the place for buying fruits and vegetables for this report. Families were asked to rate the degree of importance of factors in deciding the place to shop for fresh fruits and vegetables. The degree of importance of factors as scored on a five point Likert type scale. A score of 4 was given to the highest level of importance and zero was given to the lowest level.

Data analysis

Statistical analyses were performed using the SPSS win10.0. Descriptive statistics were used to describe the samples' characteristics. Chi-square test, T-test, ANOVA, and Scheffe test were used to compare families according to demographic variables.

RESULTS AND DISCUSSION

General characteristics of the samples

The demographic characteristics of the families are presented in Table 1. 34% of the husbands and 72% of the wives were in their thirties. 62% of husbands and 27% of the wives in their forties. About half of the husbands and 30% of the wives had graduated from a 4 year college and 32% of the husbands and about half of the wives had graduated from high school. Most husbands and about 40% of the wives had jobs and about 60% of the wives had no jobs. About 70% of the families had two children, 14% one child, 14% three children in the household.

36% of the families had a monthly income of 1,000,000~1,990,000 Won, about 30% of the families 2,000,000~2,990,000 Won, and about 30% over 3,000,000 Won. According to Korean National Statistical Office (5), families spent 429,036 Won per month on food and 173,693 Won per month on eating out in a nationwide average during the first quarter of the year in 2001. In this sample, about half of the families spent 200,000~390,000 Won/month on food which they cooked in the household and one fourth of them spent 400,000~590,000 Won/month. 17% of the families spent less than 200,000 Won/month, 11% of families spent more than 600,000 Won/month on food which they cooked in the household. One third of the families spent 100,000~190,000 Won/month, one fourth of them spent less than 100,000 Won/month, 20% of them spent 200,000~290,000 Won/month, and 24% of them spent more than 300,000 Won/month for buying food in school, work, convenient stores, restaurants, and from vending machines.

Frequency of families' intake of fresh fruits and vegetables

The frequency of families' intake of fresh fruits and vegetables is reported in Table 2. In the summer, 43% of families ate fresh fruits everyday and a half of the families ate fruits 2~4 days per week. On the other hand, 40% of families ate fresh vegetables everyday, about 55% of families ate fresh vegetables 2~4 days per week. In the winter, one fourth of families ate fresh fruits everyday, about 60% of them ate fruits 2~4 days per week. 22% of families ate fresh vegetables everyday, about 60% for 2~4 days per week. The percentage of families who ate fresh fruits and vegetables everyday in the summer was almost twice as much as that in the winter.

Table 1. Characteristics of families

			N	%
Age				
	Husbands	≤29	1	0.5
		30~39	68	34.2
		40~49	123	61.8
		≥50	7	3.5
		Total	199	100.0
	Wives	≤29	1	0.4
		30~39	165	72.1
		40~49	61	26.6
		≥50	2	0.9
		Total	229	100.0
Education				
	Husbands	≤middle school	13	5.0
		high school	83	31.8
		junior college	38	14.6
		≥4 year college	127	48.7
		Total	261	100.0
	Wives	≤middle school	14	5.4
		high school	126	48.6
		junior college	43	16.6
		≥4 year college	76	29.3
		Total	259	100.0
Job				
	Husbands	unemployed	8	6.0
		employed	125	94.0
		Total	133	100.0
	Wives	unemployed	130	61.0
		employed	83	39.0
		Total	213	100.0
Number of children		1	40	14.1
		2	204	71.8
		≥3	40	14.1
		Total	284	100.0
Income/month (10,000 Won)		<100	24	8.9
		100~199	96	35.7
		200~299	77	28.6
		300~399	43	16.0
		≥400	29	10.8
		Total	269	100.0
Expense for food/month (10,000 won)		<20	47	16.7
		20~39	134	47.7
		40~59	69	24.6
		≥60	31	11.0
		Total	281	100.0
Expense for eating-out/month (10,000 won)		<10	69	24.5
		10~19	92	32.6
		20~29	53	18.8
		30~39	34	12.1
		≥40	34	12.1
		Total	282	100.0

Difference of families' intake of fresh fruits and vegetables was analyzed according to demographic variables. The families showed a significant difference in the intake

Table 2. Frequency of families' intake of fresh fruits & vegetables by season

Frequency	Summer				Winter			
	Fruits		Vegetables		Fruits		Vegetables	
	N	%	N	%	N	%	N	%
Everyday	125	43.0	117	40.6	70	24.7	60	21.7
4 days/week	59	20.3	87	30.2	69	24.4	64	23.1
2~3 days/week	81	27.8	70	24.3	99	35.0	109	39.4
1 day/week	24	8.2	14	4.9	33	11.7	39	14.1
Less than 1 day/week	2	0.7	0	0	12	4.2	5	1.8
Total	291	100.0	288	100.0	283	100.0	277	100.0

of fruits according to the housewives' educational levels, household income, and number of children. Table 3 shows these results. The higher the education level the housewives had, the greater the percentage of families that ate fruits everyday regardless of the season. These results were consistent with the foreign researchers' results (14-19). As with educational levels, the greater the income the households had, the greater the percentage of families that ate fruits everyday. Subar et al.'s (18) report supported that fruit and vegetable intake increased with income. Smith (20) pointed out that 95% of mothers in her study samples understood the importance of eating fruits and vegetable everyday but only 39% ate them daily. Smith (20) reported that the reason they didn't put this knowledge into practice was the cost of fruits and vegetables. 71% of respondents in Smith's study commented that the cost of fruits and vegetables affected their decision to purchase them. The same explanation can be applied to this study and was identified by the facts that price was a very important factor in deciding the place for buying fruits and vegetables (see Table 7). The reason that families didn't show significant differences in the vegetables intake according to demographic variables can be explained with the fact that vegetables might be considered indispensable for Korean diet regardless of social status in the contrast with fruits. In addition, vegetables might be relatively cheap in such a small city like Gyeongju which has many vegetable gardens around, especially in the growing season. The frequencies of the intake of fruits showed significant differences according to number of children and more fam-

Table 3. Differences of families' intake of fruits according to demographic variables

Season	Demographic variables	Every day N (%)	4 days/week N (%)	2~3 days/week N (%)	1 day/week N (%)	<1 day/week N (%)	X^2 (p)
Summer	Wives' education						
	≤middle school	3 (21.4)	0 (0.0)	3 (21.4)	7 (50.0)	1 (7.1)	70.257 (0.000)
	high school	43 (34.1)	29 (23.0)	44 (34.9)	10 (7.9)	0 (0.0)	
	junior college	18 (42.9)	9 (21.4)	13 (31.0)	2 (4.8)	0 (0.0)	
	≥4 year college	47 (61.8)	16 (21.1)	10 (13.2)	3 (3.9)	0 (0.0)	
	Income/month (10,000 won)						
	<100	4 (16.0)	2 (8.0)	9 (36.0)	9 (36.0)	1 (4.0)	58.509 (0.000)
	100~199	42 (44.2)	20 (21.1)	26 (27.4)	7 (7.4)	0 (0.0)	
	200~299	31 (40.3)	21 (27.3)	22 (28.6)	3 (3.9)	0 (0.0)	
	300~399	18 (42.9)	6 (14.3)	16 (38.1)	2 (4.8)	0 (0.0)	
	≥400	20 (71.4)	6 (21.4)	1 (3.6)	1 (3.6)	0 (0.0)	
	Number of children						
	1	13 (32.5)	12 (30.0)	14 (35.0)	1 (2.5)	0 (0.0)	17.375 (0.026)
	2	93 (45.8)	37 (18.2)	57 (28.1)	16 (7.9)	0 (0.0)	
	3	16 (41.0)	10 (25.6)	6 (15.4)	6 (15.4)	1 (2.6)	
Winter	Wives' education						
	≤middle school	2 (15.4)	3 (23.1)	2 (15.4)	4 (30.8)	2 (15.4)	27.685 (0.006)
	high school	28 (23.0)	30 (24.6)	44 (36.1)	13 (10.7)	7 (5.7)	
	junior college	8 (20.0)	7 (17.5)	19 (47.5)	6 (15.0)	0 (0.0)	
	≥4 year college	26 (35.6)	23 (31.5)	18 (24.7)	6 (8.2)	0 (0.0)	
	Income/month (10,000 won)						
	<100	4 (16.7)	3 (12.5)	8 (33.3)	3 (12.5)	6 (25.0)	41.397 (0.000)
	100~199	19 (20.9)	24 (26.4)	32 (35.2)	13 (14.3)	3 (3.3)	
	200~299	18 (24.3)	20 (27.0)	27 (36.5)	7 (9.5)	2 (2.7)	
	300~399	11 (26.2)	10 (23.8)	16 (38.1)	5 (11.9)	0 (0.0)	
	≥400	13 (48.1)	8 (29.6)	5 (18.5)	1 (3.7)	0 (0.0)	

ilies who had two children ate fruits everyday compared to families with one child and three children.

The place of buying fresh fruits and vegetables

Families were asked to check all the places on the list that applied to where they got fresh fruits and vegetables. The results are presented in Table 4. Public markets or the Farmers' markets and a large supermarket were the places where families in this study got most of their fresh fruits and vegetables in both summer and winter. There was a difference in the percent of families who grew fruits and vegetables by themselves, buying them directly from farmers, and buying them from friends or relatives with a garden between summer and winter. Four times more families grew fruits and vegetables by themselves in summer compared to that in winter. Two times more families got fruits and vegetables from farmers and friends or relatives with gardens in the summer compared to the winter.

In the summer, families bought fresh fruits and vegetables from public markets or a farmers' market and the large supermarkets most frequently. This result is consistent with that of Jin (1) who studied housewives in a small city and Kang & Chung's (12) results with housewives in Seoul, even though they didn't mention the season of purchase. The purchasing places where housewives bought fruits and vegetables have changed with time. Rhee et al. (21) investigated the purchasing place with 1210 housewives in Seoul City in 1988 and reported 80% of them bought most fruits and vegetables at public markets and only 8% of housewives from a supermarket. However, large supermarkets have become the most frequently visited places by housewives for fruits and vegetables nowadays.

About 30% of the families in this study bought fruits and vegetables from small neighborhood stores and street vendors near their apartments or houses. It wasn't consistent with Jin (1) and Kang & Chung's (12) results which reported that housewives didn't buy fruits and vegetables frequently from such places. However, Lee & Yoon (22) reported on low-income customers' purchasing place for price labeled groceries and price unlabeled groceries. For price labeled groceries, supermarkets were the most frequently visited places by the customers and neighborhood stores for price unlabeled groceries. About one fourth of families in this study got their fresh fruits and vegetables from cars or pullcarts or their friends or relatives with a garden, or their own gardens in the summer.

Table 4. The place where families got fresh fruits and vegetables

Place	Summer		Winter	
	N	%	N	%
Public markets or farmers' markets	204	70.1	148	50.9
Large supermarkets	205	70.2	231	79.4
Small neighborhood stores	84	28.8	82	28.3
Grow them themselves	71	24.4	17	5.9
Direct from farmers	47	16.2	27	9.3
Friends or relatives with gardens	70	24.1	40	13.8
Agricultural Co-ops	55	18.9	49	16.9
Street vendors near apartments or houses	92	31.6	72	24.8
Cars or pullcarts	68	23.4	60	20.6

Nearly 20% of families bought fresh fruits and vegetables at an Agricultural Co-op. Agricultural Co-ops were not the place where the housewives frequently bought the fresh fruits and vegetables compared to other places. From this result, it can be thought that agricultural Co-ops in Gyeongju did not play enough role to sell the locally grown fresh fruits and vegetables. Cho et al. (23) contended that Korean Agricultural Co-ops didn't play any role in the direct trade of agricultural products despite being one of the organizations which should promote the direct trade. They explained that it was because that they had problems of motivation, goal setting, procedure, and management for the direct trade. The Agricultural Co-ops should find the reason families didn't buy fresh fruits and vegetables and improve their system to increase direct trade. There might be another reason why many housewives did not buy fresh fruits and vegetables at agricultural Co-ops in Gyeongju. There are fewer Agricultural Co-ops in Gyeongju, which makes it difficult for families to visit.

16% of families in this study bought fresh fruits and vegetables from farmers directly. Direct trade of fruits and vegetables between farmers and consumers was not active even though there were many farms in Gyeongju City. Kim & Lee (24) suggested 7 ways to activate direct trade of agricultural products between producers and consumers. Five of them which were relevant to Gyeongju City are discussed. First, it is important that producers and consumers have consensus about the importance of direct trade. Second, local government should take part positively in the administration and finance of direct trade. Third, non-profit organizations like religious organizations must play an important role in increasing the direct trade. Fourth, the markets for direct trade should be opened based on consumers' needs for agricultural products. Fifth, community supported agriculture should be more positively encouraged than ever.

In the winter, most families bought fresh fruits and vegetables from a large supermarket. In contrast to 70% in the summer, 51% of families purchased them from public markets or a farmers' market. A range of 20~30% of families bought their fruits and vegetables from a small neighborhood store, street vendors near their apartments

or houses, and cars or pullcarts. Less than 10% of families got fresh fruits and vegetables from farmers or their own gardens, An agricultural Co-op was the store 17% of families got the fresh fruits and vegetables from in the winter.

Differences of the purchasing places according to demographic factors

The respondents were asked to check all the places where they got fresh fruits and vegetables on the list. A Chi-square test was applied to find whether the demographic variables affect the choice of each of the purchasing places on the list : for example, whether they got the fresh fruits and vegetables at a large supermarket were analyzed according to the demographic variables. The results which showed the significant differences are presented in Table 5 for the summer and Table 6 for the winter. The families whose housewives graduated from a 4 year college course bought fresh fruits and vegetables at large supermarkets more frequently and at Agricultural Co-ops less frequently both in the summer and winter compared to families whose housewives graduated from middle school, high school, and junior college. The more families whose housewives had less than middle school education grew fruits and vegetables by themselves in the summer and bought them at Agricultural Co-op more frequently both in the summer and winter compared to families whose housewives graduated from high school, junior college, and 4 year college. No families whose housewives had less than middle school education bought fruits and vegetables from street vendors in the summer. Housewives who didn't have jobs bought fruits and vegetables at the small neighborhood stores more frequently compared to housewives who had jobs in both the summer and winter.

More families whose monthly income fell into the group of less than 1,000,000 Won bought fruits and vegetables from farmers directly compared to other income categories in the summer. Low income families in this study were concerned with the price when they decided on the shopping place. From the result that more low income families bought fruits and vegetables from farmers directly than higher income families, it can be inferred that direct trade between farmers and consumers was a way to save money when buying fruits and vegetables. On the other hand, farmers might try to find the reason why families wouldn't buy fruits and vegetables from them and ways to reach more customers.

There was no difference in buying fruits and vegetables from the neighborhood stores among income categories in this study. Lee & Yoon (22) reported that the less income the customers had, the shorter distance they traveled to buy food. So the customers who had low income bought their food from the neighborhood stores in their study. Lee

Table 5. Differences of the purchasing places according to demographic variables in the summer

Demographic factors \ Factors	Large supermarkets N (%)		Small neighborhood stores N (%)		Grow them themselves N (%)		Direct from farmers N (%)		Friends or relatives with the gardens N (%)		Agricultural Co-ops N (%)		Street vendors near apartments or houses N (%)	
	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
Education														
≤ middle school	7 (50.0)	7 (50.0)	1 (7.1)	13 (92.9)	11 (78.6)	3 (21.4)	3 (21.4)	11 (78.6)	1 (7.1)	13 (92.9)	5 (35.7)	9 (64.3)	0 (0.0)	14 (100.0)
high school	80 (64.0)	45 (36.0)	38 (30.4)	87 (69.6)	35 (28.0)	90 (72.0)	25 (20.0)	100 (80.0)	36 (28.8)	89 (71.2)	30 (24.0)	95 (76.0)	46 (36.8)	79 (63.2)
junior college	32 (74.4)	11 (25.6)	15 (34.9)	28 (65.1)	2 (4.7)	41 (95.3)	5 (11.6)	38 (88.4)	9 (20.9)	34 (79.1)	5 (11.6)	38 (88.4)	17 (39.5)	26 (60.5)
≥ 4 year college	65 (85.5)	11 (14.5)	23 (30.3)	53 (69.7)	9 (11.8)	67 (88.2)	9 (11.8)	67 (88.2)	15 (19.7)	61 (80.3)	7 (9.2)	69 (90.8)	26 (34.2)	50 (65.8)
X^2 (p)	14.085 (0.003)**		3.992 (0.262)		40.720 (0.000)***		3.323 (0.345)		4.770 (0.189)		11.074 (0.011)*		8.152 (0.043)*	
Job														
no	96 (73.8)	34 (26.2)	50 (38.5)	80 (61.5)	25 (19.2)	105 (80.8)	29 (22.3)	101 (77.7)	32 (24.6)	98 (75.4)	23 (17.7)	107 (82.3)	48 (36.9)	82 (63.1)
yes	57 (69.5)	25 (30.5)	14 (17.1)	68 (82.9)	22 (26.8)	60 (73.2)	12 (14.6)	70 (85.4)	24 (29.3)	58 (70.7)	17 (20.7)	65 (79.3)	25 (30.5)	57 (69.5)
X^2 (p)	0.470 (0.493)		10.915 (0.001)***		1.683 (0.195)		1.898 (0.168)		0.560 (0.454)		0.303 (0.582)		0.922 (0.337)	
Income														
<100	15 (62.5)	9 (37.5)	7 (29.2)	17 (70.8)	8 (33.3)	16 (66.7)	9 (37.5)	15 (62.5)	4 (16.7)	20 (83.3)	6 (25.0)	18 (75.0)	3 (12.5)	21 (87.5)
100~199	62 (65.3)	33 (34.7)	23 (24.2)	72 (75.8)	25 (26.3)	70 (73.7)	13 (13.7)	82 (86.3)	26 (27.4)	69 (72.6)	22 (23.2)	73 (76.8)	35 (36.8)	60 (63.2)
200~299	56 (73.7)	20 (26.3)	21 (27.6)	55 (72.4)	17 (22.4)	59 (77.6)	15 (19.7)	61 (80.3)	17 (22.4)	59 (77.6)	9 (11.8)	67 (88.2)	26 (34.2)	50 (65.8)
300~399	32 (74.4)	11 (25.6)	19 (44.2)	24 (55.8)	7 (16.3)	36 (83.7)	4 (9.3)	39 (90.7)	4 (9.3)	39 (90.7)	12 (27.9)	31 (72.1)	17 (39.5)	26 (60.5)
≥400	23 (79.3)	6 (20.7)	8 (27.6)	21 (72.4)	3 (10.3)	26 (89.7)	4 (13.8)	25 (86.2)	11 (37.9)	18 (62.1)	2 (6.9)	27 (93.1)	10 (34.5)	19 (65.5)
X^2 (p)	3.754 (0.440)		5.940 (0.204)		5.826 (0.213)		10.376 (0.035)*		9.718 (0.045)*		9.097 (0.059)		5.870 (0.209)	
Number of children														
1	31 (77.5)	9 (22.5)	10 (25.0)	30 (75.0)	12 (30.0)	28 (70.0)	6 (15.0)	34 (85.0)	6 (15.0)	34 (85.0)	8 (20.0)	32 (80.0)	11 (27.5)	29 (72.5)
2	144 (71.3)	58 (28.7)	61 (30.2)	141 (69.8)	40 (19.8)	162 (80.2)	28 (13.9)	174 (86.1)	52 (25.7)	150 (74.3)	39 (19.3)	163 (80.7)	70 (34.7)	132 (65.3)
3	23 (57.5)	17 (42.5)	10 (25.0)	30 (75.0)	15 (37.5)	25 (62.5)	11 (27.5)	29 (72.5)	9 (22.5)	31 (77.5)	6 (15.0)	34 (85.0)	10 (25.0)	30 (75.0)
X^2 (p)	4.218 (0.121)		0.756 (0.685)		6.776 (0.034)*		4.663 (0.097)		2.168 (0.338)		0.450 (0.798)		1.909 (0.385)	

*p<0.05, **p<0.01, ***p<0.001.

Table 6. Differences of the purchasing places according to demographic variables in the winter

Demographic factors \ Factors	Public markets or Farmer's markets N (%)		Large supermarkets N (%)		Small neighborhood stores N (%)		Grow them themselves N (%)		Agricultural Co-ops N (%)	
	yes	no	yes	no	yes	no	yes	no	yes	no
Education										
≤middle school	12 (85.7)	2 (14.3)	8 (57.1)	6 (42.9)	1 (7.1)	13 (92.9)	2 (14.3)	12 (85.7)	5 (35.7)	9 (64.3)
high school	65 (52.4)	59 (47.6)	99 (79.8)	25 (20.2)	32 (25.8)	92 (74.2)	9 (7.3)	115 (92.7)	26 (21.0)	98 (79.0)
junior college	22 (51.2)	21 (48.8)	34 (79.1)	9 (20.9)	16 (37.2)	27 (62.8)	0 (0.0)	43 (100.0)	4 (9.3)	39 (90.7)
≥4 year college	33 (43.4)	43 (56.6)	69 (90.8)	7 (9.2)	26 (34.2)	50 (65.8)	0 (0.0)	76 (100.0)	6 (7.9)	70 (92.1)
X^2 (p)	8.588 (0.035)*		10.338 (0.016)*		6.245 (0.100)		11.426 (0.010)**		11.502 (0.009)**	
Job										
no	72 (55.8)	57 (44.2)	104 (80.6)	25 (19.4)	46 (35.7)	83 (64.3)	6 (4.7)	123 (95.3)	20 (15.5)	109 (84.5)
yes	39 (47.6)	43 (52.4)	65 (79.3)	17 (20.7)	15 (18.3)	67 (81.7)	3 (3.7)	79 (96.3)	13 (15.9)	69 (84.1)
X^2 (p)	1.370 (0.242)		0.057 (0.811)		7.357 (0.007)**		0.121 (0.728)		0.005 (0.946)	
Income										
<100	18 (78.3)	5 (21.7)	14 (60.9)	9 (39.1)	4 (17.4)	19 (82.6)	3 (13.0)	20 (87.0)	4 (17.4)	19 (82.6)
100~199	50 (52.6)	45 (47.4)	74 (77.9)	21 (22.1)	23 (24.2)	72 (75.8)	5 (5.3)	90 (94.7)	15 (15.8)	80 (84.2)
200~299	34 (44.7)	42 (55.3)	62 (81.6)	14 (18.4)	25 (32.9)	51 (67.1)	4 (5.3)	72 (94.7)	11 (14.5)	65 (85.5)
300~399	19 (44.2)	24 (55.8)	36 (83.7)	7 (16.3)	15 (34.9)	28 (65.1)	0 (0.0)	43 (100.0)	10 (23.3)	33 (76.7)
≥400	14 (48.3)	15 (51.7)	26 (89.7)	3 (10.3)	8 (27.6)	21 (72.4)	0 (0.0)	29 (100.0)	2 (6.9)	27 (93.1)
X^2 (p)	9.011 (0.061)		7.604 (0.107)		3.856 (0.426)		7.513 (0.111)		3.671 (0.452)	
Number of children										
1	20 (50.0)	20 (50.0)	33 (82.5)	7 (17.5)	10 (25.0)	30 (75.0)	2 (5.0)	38 (95.0)	8 (20.0)	32 (80.0)
2	100 (49.8)	101 (50.2)	163 (81.1)	38 (18.9)	58 (28.9)	143 (71.1)	7 (3.5)	194 (96.5)	35 (17.4)	166 (82.6)
3	22 (55.0)	18 (45.0)	27 (67.5)	13 (32.5)	10 (25.0)	30 (75.0)	6 (15.0)	34 (85.0)	5 (12.5)	35 (87.5)
X^2 (p)	0.373 (0.830)		4.045 (0.132)		0.424 (0.809)		8.768 (0.012)**		0.849 (0.654)	

*p<0.05, **p<0.01.

& Yoon (22) studied the urban low-income customers who lived in Incheon which is bigger than Gyeongju. Therefore, they had to travel farther to get them at public markets or large supermarkets. However, Gyeongju is a relatively small city, and to travel to get fruits and vegetables might not be a major problem for low income families. It can be confirmed that about 70% of the families spent less than 20 minutes on shopping for food and about 45% of the families were satisfied with the distance that they had to travel to get fruits and vegetables.

The factors influencing decision of shopping place for fresh fruits and vegetables

The mean score of each factor influencing the decision of the place to shop for fresh fruits and vegetables is presented in Table 7. "Quality" and "safe production" of fruits and vegetables and "clean environment of store" were the factors which showed a greater than 3 score out of 4. "Being treated as a valuable customer" and "availability of public transportation" were the factors which gained a lower than 2 score. As the quality of products was ranked first in this study, other studies showed the same results as this. Yoon et al. (25) reported that quality was the main criteria for purchasing farm products. Chun et al. (26) also reported that quality was the first ranked factor for choosing the store for agricultural products.

Table 7. The mean score[1)] of factors influencing decision of shopping place for fresh fruits and vegetables

Factors	N	M±SD
Quality, freshness, appearance	275	3.71±0.76
Safe (pesticides, spoilage) production	255	3.55±0.95
A clean environment (clean shelves, floors)	270	3.13±1.06
Buying at one place	273	2.93±1.31
Variety	260	2.85±1.25
Price	271	2.74±1.31
Near to the house	258	2.48±1.39
Friendly and knowledgeable personnel	265	2.37±1.36
An attractive atmosphere	266	2.35±1.34
Availability of locally grown food	261	2.33±1.38
Ease of finding things	260	2.24±1.33
Being treated as a valuable customer	258	1.75±1.38
Availability of public transportation	259	1.50±1.49

[1)]score: 4, very important; 3, important; 2, so-so; 1, less important; 0, least important.

Price, variety, distance, transportation were ranked after quality, and cleanness was ranked 6th out of 9 positions in Chun et al.'s (26) report. However, safety from pesticides or spoilage, a clean store environment, and buying at one place were ranked above variety and price for respondents in this study. Transportation was ranked 5th out of 9 positions in Chun et al.'s (26) report, however

availability of public transportation was ranked last out of 13 positions in these samples. The differences in results between Chun et al.'s (26) and this study might be due to the difference of residence. The sample of Chun et al.'s (26) study were the housewives of a large city in contrast with a small city, Gyeongju, for this study population. Residents might be concerned about transportation in a crowded large city more than those in a small city. For safety and cleanness, the residents of small cities might be concerned about safety and cleanness more than those in large cities because they might think the inspection and monitoring system for food hygiene were not adequate in small cities.

Comparison of the factors influencing decision of shopping place according to demographic variables

The mean scores in Table 7 were compared according to housewives' educational levels, income, and housewives' jobs, and number of children. Housewives' age, housewives' educational level, and income were the variables which showed significant differences. The results are reported in Table 8. Housewives who were in their thirties thought that the clean environment of the stores and being treated as a valuable customer were the important factors in deciding the place to buy fresh fruits and vegetables compared to housewives in their forties. It was found that there was a demand for high quality of hygiene and service from retailers among young housewives.

The price, availability of transportation, and availability of locally grown food were the factors which showed significant difference according to housewives' educational levels. Housewives who had less than middle school education thought the price was an important factor for making a decision on the shopping place for fruits and vegetables compared to housewives who had more than high school education. Jin (1) also reported that the price was the most important factor for housewives who had less than middle school education when they bought vegetables. Housewives with less than middle school education thought the availability of public transportation was an important factor.

Housewives with less than middle school education responded whether they could buy locally grown fruits and vegetables was an important factor in deciding the place compared to housewives who had more than high school education. Yoon et al. (25) pointed out that most housewives in her study were willing to buy the locally grown food instead of imported food when they had equal quality. However, 53% of the housewives in Yoon et al.'s study were willing to buy imported food if the locally grown food was more expensive than imported food. Most families (91%) preferred to buy fruits and vegetables grown in Gyeongju area (data not shown). However, they didn't seem to have much interest in locally grown fruits and vegetables when they actually decided to buy them, especially for housewives with more than high school edu-

Table 8. Comparison of the mean score[1)] of factors influencing decision of shopping place according to demographic variables

Demographic factors \ Factors	Price M±SD	A clean environment (clean shelves, floors) M±SD	Being treated as a valuable customer M±SD	Availability of public transportation M±SD	Availability of locally grown food M±SD
Wives' age					
30~39	2.62±1.38	3.35±0.90	1.88±1.36	1.31±1.43	2.40±1.36
40~49	2.82±1.15	2.96±1.10	1.45±1.34	1.67±1.53	2.26±1.39
T (p)	-1.102 (0.273)	2.557 (0.011)*	1.982 (0.049)*	-1.573 (0.117)	0.629 (0.530)
Wives' education					
≤middle school	3.91±0.30	3.08±1.38	2.25±1.66	2.50±1.88	3.00±1.34
high school	2.93±1.28	3.22±1.02	1.81±1.32	1.57±1.52	2.59±1.35
junior college	2.52±1.27	3.00±1.05	1.28±1.23	1.39±1.28	2.16±1.31
≥4 year college	2.32±1.23	3.23±0.85	1.64±1.38	1.06±1.36	1.86±1.35
F (p)	7.351 (0.000)***	0.604 (0.613)	2.213 (0.087)	4.080 (0.008)**	5.430 (0.001)***
Income/month (10,000 Won)					
<100	3.61±0.85	3.05±1.02	1.95±1.54	1.79±1.65	2.73±1.61
100~199	3.00±1.22	3.26±1.07	1.63±1.47	1.56±1.47	2.33±1.43
200~299	2.67±1.27	3.13±1.08	1.74±1.20	1.68±1.55	2.49±1.29
300~399	2.21±1.30	3.03±0.97	1.80±1.16	1.03±1.21	2.17±1.36
≥400	2.22±1.31	3.16±0.99	1.75±1.54	1.16±1.55	1.75±1.19
F (p)	6.300 (0.000)***	0.434 (0.784)	0.267 (0.899)	1.764 (0.137)	1.917 (0.108)

[1)]score: 4, very important; 3, important; 2, so-so; 1, less important; 0, least important.
*p<0.05, **p<0.01, ***p<0.001.

cation. Housewives who had more than high school education gave a high score on the variety and quality of fruits and vegetables and buying at one place even though there were no significant differences among the education groups (data not shown). Farmers in Gyeongju have to find the reason why families didn't buy the locally grown food and try to meet the consumers' needs in order to increase their income.

Among thirteen factors, the price was the only one which showed significant difference according to income. Families which had a monthly income of lower than 1,000,000 Won and 1,000,000~1,990,000 Won thought the price was more important compared to families with over 3,000,000 Won. Other researchers (12,22,25) also found that the price was the most important factor for low-income customers.

Satisfaction of quality and variety with the fruits and vegetables

They were asked how satisfied they were with the quality and the variety of the fresh fruits and vegetables available in the Gyeongju area. Half of the families were satisfied with the quality, about 40% on the variety of the fresh fruits and vegetables. About 45% of families thought the quality and variety of fresh fruits and vegetables were average. About 70% of the families spent less than 20 minutes on shopping for foods. They were asked whether they were satisfied with the distance that they had to travel to get the kinds of fruits and vegetables they wanted. About 45% of families were satisfied, 17% of them were not satisfied, 37% were average. Half of the families drove their own car when they traveled to buy foods, about one third of them walked, 12% used a bus, and about 3% of them rode bicycles. When the fruits and vegetables were not available while they were shopping, 38% of families went somewhere else for them. 25% of families thought where they shopped always had the fruits and vegetables that they wanted.

SUMMARY

A survey on families' purchasing behavior about fresh fruits and vegetables was conducted to increase understanding of families's food decision making. Two hundred ninety seven families with at least one elementary-school age child were selected from four elementary schools to complete questionnaires during April, 2001 in Gyeongju, Korea. The general information about household, frequency of the intake of fruits and vegetables, places of buying them, and factors affecting the decision of the place for buying fruits and vegetables were obtained. Descriptive statistics were used to describe the samples' characteristics. A Chi-square test, T-test, and ANOVA statistics were used to compare families according to demographic variables. The major findings are as follows:

1) Most husbands and wives fell into the age range of 30~49. Most husbands and wives had more than high school education. Most husbands and 40% of the wives had jobs and 70% of families had two children. About 55% of families had a monthly income under 2,000,000 Won and the rest over 2,000,000 Won. About half of families spent 200,000~390,000 Won/month for food which was cooked at home and 100,000~290,000 Won/month was spent on eating-out.

2) About 70% of families consumed fruits and vegetables more than 4 days per week in the summer. The percentage of families who ate fresh fruits and vegetables everyday in the summer was almost twice as much as that in the winter. More families whose housewives had a higher education level and who had higher income ate fruits everyday regardless of the season.

3) Families bought fresh fruits and vegetables at the public markets or the farmer's markets and a large supermarket most frequently in both summer and winter. These families grew them by themselves and bought them from farmers directly least frequently in both summer and winter. Families whose housewives had less than middle school education bought fruits and vegetables from Agricultural Co-ops and grew them by themselves more frequently compared to those who had higher education. On the other hand, families whose housewives had graduated from 4 year college bought fruits and vegetables from large supermarkets more frequently compared to those who had lesser education. Families whose housewives had no jobs bought fruits and vegetables at small neighborhood stores more frequently in both summer and winter compared to families whose housewives had jobs.

4) "Quality" and "safety production" of fruits and vegetables and "clean environment of store" were the first three factors which families rated "important" when they decided the place to buy fruits and vegetables. "Being treated as a valuable customer" and "availability of public transportation" were the last two factors.

5) Families whose housewives were in their thirties valued cleanness of the store and being treated as a valuable customer important factors when they decided the place. Families whose housewives had less than middle school education thought that price, availability of public transportation, and availability of locally grown foods were the important factors for deciding the place compared to those who had higher education. The price was the factor which low-income families thought important for decision making on the place to buy fruits and vegetables.

6) Half of the families were satisfied with the quality,

about 40% with the variety of fresh fruits and vegetables which were available in Gyeongju. About 45% of families were satisfied with the distance that they had to travel to get the kinds of fruits and vegetables they wanted.

Some implication can be drawn from these results. The families who had elementary-school age children need to increase intake of fresh fruits and vegetables. Buying fruits and vegetables from Agricultural Co-ops and producers directly were not the ways which families got them frequently. Especially, families whose housewives had higher education and had higher income used those ways less frequently compared to lower education and income groups. Farmers should find the demands of families of high socioeconomic status to meet their needs. Families thought the quality and safe production of fruits and vegetables, buying at one place, and variety and price were important when they decided the place to buy. Therefore, farmers should supply clean fresh fruits and vegetables with high quality and wide variety, and local government should help farmers technically and financially to grow and sell safely produced fruits and vegetables with high quality. Large supermarkets were the places families visited frequently, especially most frequently in the winter. So, farmers should try to negotiate with the supermarket owners to supply the stores with fruits and vegetables at a reasonable price and for the supermarkets to clearly label them as locally grown products, perhaps providing a highlighted, separate section for them because most families preferred to buy locally grown fruits and vegetable.

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