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A Study on Nutritional Status of the Korean Farmers and Analysis of Relationship between Related Variables

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Abstract

General purpose of the study was to understand nutritional status of the Korean farmers and thus provide rural nutrition intervention programs with more useful information and data. The data for the study was collected two times from the 603 sample farm households in 1982 and 1987. The main results of the study were as follows ; 1) Food intake of the Korean farmers was highly dependent upon vegetable foods especially on cereals and grains. However, the unbalanced food intake pattern was gradually improved as consumption of vegetable foods was decreased from 992.8 grams per person per day in 1982 to 946.4g in 1987, and that of animal foods increased from 54.2g to 91.3g . 2) In mean value analysis on nutrient intake of the farmers, intakes of energy and protein were nearly reached to Recommended Dietary Allowances(RDA) level ; intakes of calcium, vitamin A, and riboflavin were quite deficient, whereas iron, thiamin, niacin, and ascorbic acid were well over. From 1982 to 1987, intakes of all nutrients except energy were increased. 3) In distribution analysis on nutrient intake, coefficient of variation(CV) of all nutrients except iron was increased. As to skewness(SK), the coefficients of calcium, iron, vitamin A, riboflavin and ascorbic acid were decreased. Kurtosis (Ku) of iron and vitamin A was increased. On the whole, distributions of nutrient intake of the farmers were changed in undesirable ways, although the mean values of the nutrient intake were improved. 4) In relationship analysis among 115 relationships, 76 relationships were consistent between 1982 and 1987. Of 76 consistent relationships only 10 relationships were significant at 5% level such as the protein intake level and the balance of food intake, calcium intake level and the age, etc.

Introduction

"The main objective of a nutritional survey is to provide the data needed for the planning or improvement of nutrition intervention programs" [1]. In order to efficiently implement nutrition intervention programs for the population of certain communities, understanding the present nutritional status of their residents is the most important and basic work[2-4]

In Korea, especially for rural residents, there have been many nutrition/dietary surveys, however, the sample size of them was not sufficient to cover whole rural populations[5-18]. Furthermore, for the information to be more useful, the result from the field survey should be able to not only analyze and understand the exact nutritional status of the population but also give more detailed and direct methods which can be easily and directly applied to related nutrition intervention programs. In this respect, many previous surveys did not reach the desired level of the practical need.

Therefore, studies on methodology and approach in terms of measurement, survey, and analysis for understanding nutritional status of community should be emphasized and reinforced. The study was conducted based on such points.

General purpose of the study was to understand nutritional status of the Korean farmers and thus provide rural nutrition intervention programs with more useful information and data. Specific objectives of the study were :

1) to understand the food and nutritional status of the Korean farmers and its change,
2) to analyze the distribution of nutrient intake level of the farmers,
3) to analyze the relationships between related variables, and
4) to develop a method for analyzing survey data related to food and nutritional status.

Meterials and Methods

For the study, 603 farm households were sampled based on the total number of nationwide farm households by systematic cluster sampling method. The field survey was carried out in Feb. 1982 and 1987. For the second survey, the same sample frame was used. About 30 percent of the sample was, however, changed for various reasons. The field survey was done by home improvement extension workers with a structured questionnaire. Methodology for assessing nutritional status can be diversely classified[19-32]. For the study, two methods of dietary survey and anthropometric measurement were employed.

Measurement of food intake was done by precise weighing method for three consecutive days. Data for individual/household characteristics were collected by interview method with the housewife. Height and weight of the households' members were measured by physical weighing method. Materials collected were processed by VAX-11 computer system in Rural Development Administration.

Data analysis was largely divided into three stepsal : descriptive analsysis to understand exact situation on food, nutrition, and related characteristics, relationship analysis to find out significant relationships between related besvarial, and comparative analysis to analyze trend or difference between 1st and 2nd survey results.

For the analysis of nutrient intake level, mean value analysis has been commonly used[33-35]. In this method, the result is presented in form of average quantity of nutrient intake, RDA, and intake rate to RDA. It is, however, nearly impossible to identify target group or problem group only by mean value analysis. Especially when the mean value of nutrient intake level is reached or is over RDA level, it can be regarded that there is no nutritional deficient problem.

For the distribution analysis, standard deviation (SD), coefficient of variation(CV), skewness(Sk), and kurtosis(Ku) with frequency graph were utilized. In terms of skewness explaining distortion of distribution, the theoretical range of Sk coeffcient is $+1.0$ to -1.0, and normal distribution has zero value. In general, it is interpreted that Sk value 0.1 is slightly skewed, and Sk value 0.3 is noticeably skewed.

As for the kurtosis representing concentration to the center, theoretical range of Ku coefficient is zero to 0.5 and normal distribution is 0.2630. In evaluating the Ku coefficient, there are three types : leptokurtic, mesoskurtic, and platykurtic[36]. Ku coefficients of 0.5, 0.25, and 0.0 are defined as leptokurtic, mesokurtic, and platykurtic respectively. As far as nutrient intake level of the community is concerned, desirable distribution has to be balanced with near zero value of Sk coefficient, and leptokurtic kurtosis. For assessing nutritional status based on physical measurement, the Rohrer Index(RI) was utilized. The formula of the Index

is as follows : $RI=(W\div H^3)\times 100$, where W=weight in g and H=height in cm[37].

Secondly, the relationships between related variables were analyzed by using the analysis model (Model 1). According to the model, five individual/household characteristics such as annual income, farming type, geographical type of the household, age and educational level of the housewife were selected as independent variables. Five dietary characteristics such as balance of food intake, cooking skill level of the housewife, priority on cooking, frequency to market for purchasing food, and frequency of mixed diet with barley were selected as intermediate variables. Nine nutrient intake levels were selected as dependent variables I and Rohrer Index for physical status as dependent variable II.

According to the analysis model, the method of analysis was divided into six categories from Analysis I to Analysis VI. In Analysis I, the relationships between the individual/household characteristics and the dietary characteristics were analyzed by x^2-test. In Analysis II, the relationships between the individual/household characteristics and the nutrient intake level were analyzed by analysis of variance(ANOVA).

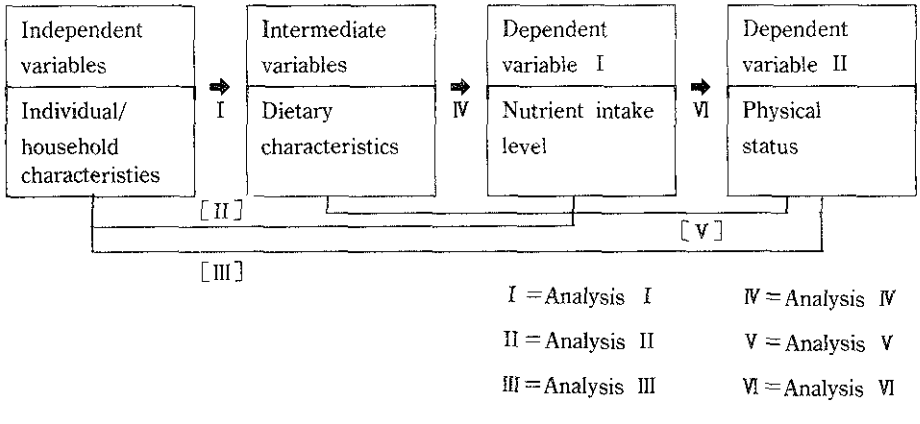
In Analysis III for relationships between the individual/household characteristics and the physical status, its significance was tested by x^2-method. In Analysis IV the relationships between the dietary characteristics and the nutrient intake level were analyzed by ANOVA. In Analysis V, the relationships between the dietary characteristics and the physical status were analyzed by x^2-test. Lastly, in Analysis VI the relationships between the nutrient intake level and the physical status were analyzed by ANOVA.

After the descriptive analysis and distribution analysis in 1982 and 1987, the two results were compared.

Results and Discussion

General characteristics

The general characteristics of the sample in 1982 and 1987 are presented in Table 1. In Table 1, age of the housewives was older. The education level of the sample farm housewives was raised. Annual income of the households was also greatly increased due to the economic growth of the nation. And the geographical type of the village in which the household was located was the same because the same sample frame was used for two surveys.



[Model 1] Model of relationship analysis between related variables.

Table 1. General characteristics of the sample farmers

(unit : %)

	'87(A)	'82(B)	A−B
[Age]			
<30 years	9.8	14.1	− 4.3
30~40 years	19.6	22.2	− 2.6
40~50 years	33.3	36.8	− 3.5
>50 years	37.3	26.9	10.4
[Education level]			
None	24.9	24.2	0.7
Elementary school	53.1	61.4	− 8.3
Middle school	16.9	10.4	6.5
High school	5.1	4.0	1.1
[Annual income]			
<2 million won	13.1	33.0	−19.9
2~4 million won	35.0	42.3	− 7.3
>4 million won	51.9	24.7	27.2
[Geographical type]			
Plain area	37.3	37.3	0
Middle area	25.4	25.4	0
Mountainous area	23.9	23.9	0
Coastal area	13.4	13.4	0
Total	100	100	0

Dietary characteristics

The dietary characteristics of the sample in 1982 and 1987 are presented in Table 2. Balance of food intake of the farmers got worse. However, the cooking skill level of the housewives was obviously improved. And the priority on cooking was similar in terms of nutritional consideration.

The frequency to market for purchasing food was slightly decreased due to the increase of the 『almost none』 group. And the degree of mixed diet with barley was similar.

Food intake

The amount of food intake of the farmers by the year is compared in Table 3. Total amount of food intake was slightly decreased from 1,047.0g per person per day in 1982 to 1,037.7g in 1987 because of the considerable decrease in consumption of cereals and grains. On the other hand, animal food intake was increased drastically from 54.2 g to 91.3g.

Comparing change by percentage not by amount, the food group with the highest increase rate was milk followed by meat, eggs, beverages, and fruits.

As compared to the national nutrition survey[34], the food intake pattern was changed in a similar way, although the quantity of change was quite different.

Table 2. Dietary characteristics of the sample farmers

(unit : %)

	'87(A)	'82(B)	A−B
[Food intake]			
2~3 Groups	28.5	9.3	19.2
4 Groups	43.3	58.7	−15.4
5 Groups	28.2	32.0	− 3.8
[Cooking skill level]			
Low level	17.9	28.7	−10.8
Middle level	56.7	63.8	− 7.2
High level	25.4	7.5	17.9
[Priority on cooking]			
Taste	47.3	41.1	6.2
Preference	26.2	25.2	1.0
Nutrition	8.8	9.5	− 0.7
Cost	9.3	9.5	− 0.2
No consideration	8.5	14.8	− 6.3
[Frequency to market]			
Almost none	28.4	19.1	9.3
1~2/Month	20.9	32.2	−11.3
3~4/Month	31.7	30.7	1.0
>5 /Month	19.1	18.1	1.0
[Mixed diet]			
Almost none	29.5	33.2	− 3.7
Frequently	39.6	39.6	0.6
Always	30.9	27.9	3.0
Total	100	100	0

Table 3. Food intake of the farmers (per person per day : g)

Food groups	Amount of food intake			
	'87(A)	'82(B)	A−B	%A−B
[Vegetable foods]	[946.4]	[992.8]	−46.4	− 4.7
Cereals/grains	473.0	522.3	−49.3	− 9.4
Potatoes/sugar	42.6	41.5	1.1	2.7
Pulses	41.0	48.1	− 7.1	−14.8
Vegetables/mushrooms	299.0	308.1	− 9.1	− 3.0
Fruits	13.3	8.1	5.2	64.2
Seaweeds	12.8	14.3	− 1.5	10.5
Beverages	12.8	6.8	6.0	88.2
Seasonings	40.8	35.0	5.8	16.6
Seeds/oils	11.1	8.6	2.5	29.1
[Animal foods]	[91.3]	[54.2]	37.1	68.5
Meat/meat products	25.5	9.3	16.2	174.2
Fishes/shells	45.2	38.2	7.0	18.3
Milk/milk products	7.2	1.2	6.0	500.0
Eggs	13.3	5.5	7.8	141.8
Fats/oils	0.1	0.0	0.1	−
Total	1,037.7	1,047.0	− 9.3	− 0.9

Nutrient intake

Mean value analysis

Amount of nutrient intake and intake rate(% RDA) by mean value in 1982 and 1987 are presented in Table 4. Intakes of energy and protein nearly reached the RDA level ; intakes of calcium, vitamin A, and riboflavin were quite deficient, and iron, thiamin, niacin, and ascorbic acid were well over. From 1982 to 1987, almost all nutrient intake rates except energy were increased. Of the nine nutrients, iron intake was increased at the highest rate, and most of the other nutrients did not inc-

Table 4. Nutrient intake of the farmers (unit : % RDA)

Nutrients		Amount		% RDA	
		'87	'82	'87	'82
Energy	kcal	2,186	2,188	97.0	97.6
Protein	g	73.3	69.4	99.0	95.0
Calcium	mg	614.0	542.9	85.9	74.4
Iron	mg	20.5	18.3	158.9	133.6
Vitamin A	IU	5,582	4,867	95.1	83.5
Thiamin	mg	1.25	1.20	125.0	120.1
Riboflavin	mg	1.04	0.97	78.2	72.4
Niacin	mg	23.9	23.0	159.3	155.4
Ascorbic acid	mg	84.5	79.2	169.0	161.6

rease significantly. This result was quite different, compared to the national nutrition survey[34], which showed decrease in vitamin A, thiamin, and vitamin C.

Distribution analysis

All coefficients for distribution analysis of the farmers' nutrient intake level in 1982 and 1987 are summarized in Table 5 and their graphic comparison is presented in Fig. 1. Coefficients of variation for energy and protein were relatively low, which indicates homogeneous distributions. Coefficients of variation for all nutrients except iron were slightly increased during the period. It means that the distribution of the nutrient intake level was changed in undesirable ways.

As to skewness coefficients, all the distributions had positive coefficients. Distributions of energy

Table 5. Distribution analysis of nutrient intake level of the farmers

		X(%)	SD	CV(%)	Sk	Ku	<70%(%)	130%<(%)
Energy	'87	97.5	27.0	27.7	0.1515	0.2635	10.4	11.1
	'82	97.9	22.9	23.4	0.0967	0.2690	8.3	8.1
	D[1]	−0.4	4.1	4.3	0.0548	−0.0055	2.1	3.0
Protein	'87	99.0	35.9	36.2	0.1500	0.2570	17.9	15.3
	'82	95.7	28.3	29.6	0.1351	0.2712	16.7	12.1
	D	3.3	7.6	6.6	0.0149	−0.0142	1.2	3.2
Calcium	'87	87.8	48.4	55.1	0.1538	0.2407	41.6	14.3
	'82	76.0	38.0	49.9	0.3023	0.2541	53.9	8.6
	D	11.8	10.4	5.2	−0.1485	−0.0134	−12.3	5.7
Iron	'87	164.4	107.7	65.5	0.2666	0.2595	11.6	51.6
	'82	134.6	95.5	70.9	0.3086	0.2454	14.8	37.6
	D	29.8	12.2	−5.4	−0.0420	0.0141	−3.2	14.0
Vitamin A	'87	94.6	93.4	98.7	0.2530	0.2470	51.7	21.9
	'82	83.1	71.1	85.1	0.3333	0.2322	53.9	18.4
	D	11.5	22.3	13.6	−0.0803	0.0148	−2.2	3.5
Thiamin	'87	125.4	55.5	44.2	0.1785	0.2225	9.5	36.5
	'82	120.1	42.0	34.9	0.0416	0.2500	6.5	31.8
	D	5.3	13.5	9.3	0.1369	−0.0275	3.0	4.7
Riboflavin	'87	79.2	33.5	42.3	0.1219	0.2608	46.1	8.1
	'82	73.4	30.6	41.7	0.2000	0.2692	53.2	3.8
	D	5.8	2.9	0.6	−0.0781	−0.0084	−7.1	4.3
Niacin	'87	159.6	81.6	51.1	0.2658	0.2187	3.8	55.7
	'82	155.9	64.3	41.2	0.2307	0.2318	0.8	64.9
	D	3.7	17.3	9.9	0.0351	−0.0131	3.0	−9.2
Ascorbic acid	'87	168.9	105.7	62.6	0.1282	0.2525	12.9	31.3
	'82	162.3	90.7	55.9	0.2252	0.2527	10.9	55.4
	D	6.6	15.0	6.7	−0.0970	−0.0002	2.0	−24.1

[1] : D means difference between '82 and '87.

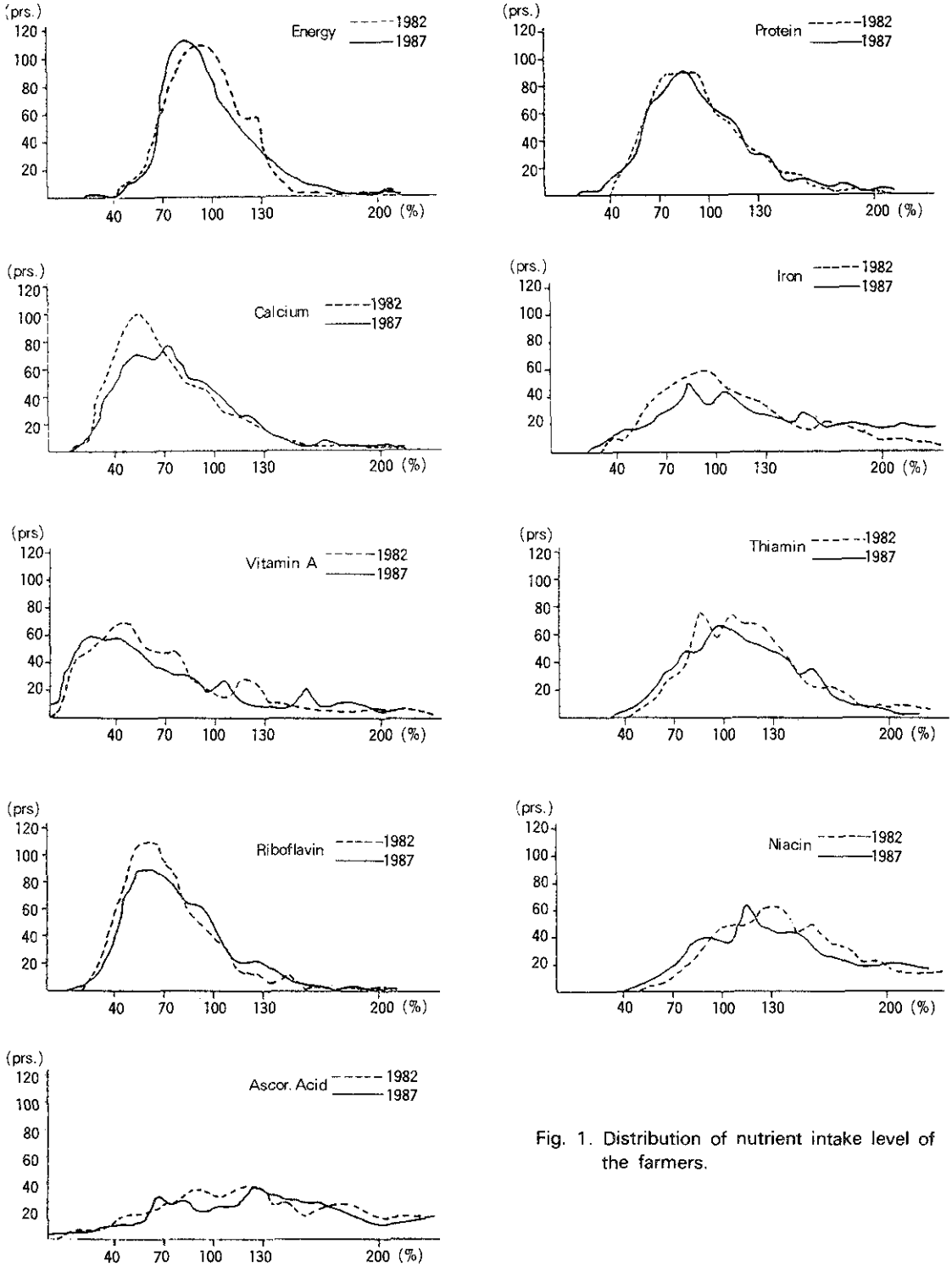


Fig. 1. Distribution of nutrient intake level of the farmers.

and protein were slightly skew, and iron and vitamin A were noticeably skew. Sk coefficients of calcium, iron, vitamin A, riboflavin, and ascorbic acid were decreased during the five years, which means a change in a desirable way. The largest increase in the Sk coefficient was that of thiamin ; on the contrary, the largest decrease was calcium.

In terms of kurtosis, all the distribution types were roughly mesokurtic distribution. And the coefficients were decreased slightly in all nutrients except iron and vitamin A. Such a decrease in Ku coefficient indicates that the distribution of the nutrient intake level is spreading in an undesirable way.

The percentage of the sample categorized into significantly deficient group of 『less than 70% of the RDA level』 was increased in five nutrients of energy, protein, thiamin, niacin, and ascorbic acid. While this group was also decreased in four nutrients including calcium, iron, vitamin A, and riboflavin, the group of 『130% or more』 was increased in seven nutrients except in two nutrients, niacin and ascorbic acid.

On the whole, distributions of nutrient intake of the farmers was changed in undesirable ways although the mean values of the nutrient intake were improved. From the results it can be implied that distribution analysis rather than mean value analysis should be employed to analyze and evaluate nutritional status of the people under any nutrition intervention programs.

Nutritional status

Nutritional status of the farmers was assessed by physical measurement of height and weight in 1982, and converted to Rohrer Index. The distibution of the farmers' Rohrer Index is presented in Table 6 and 7. The Table 6 was prepared based on individual farmers and Table 7 based on household.

In Table 6, the largest group was 『1.30－1.39』 group. When physical status is classified into three groups ; thin(less than 1.30), normal(1.30－1.49), obese group (1.50 or more), 38.7 percent of the farmers belonged to the normal group, 37.8 percent thin, and 23.4 percent obese.

And now, the Rohrer Index based on household in Table 7 showed a different distribution. More than half(57.5%) of the sample belonged to the normal group.

Table 6. Physical status of the farmers based on individual unit

Rohrer index	Person	Percent	Remarks
<0.99	31	1.2	
1.00～1.09	94	3.6	thin
1.10～1.19	300	11.4	(37.8%)
1.20～1.29	570	21.6	
1.30～1.39	617	23.4	normal
1.40～1.49	404	15.3	(38.7%)
1.50～1.59	262	9.9	
1.60～1.69	140	5.3	
1.70～1.79	106	4.0	obese
1.80～1.89	36	1.4	(23.4%)
1.90～1.99	29	1.1	
>2.00	46	1.7	
Total	2,635	100	
Average=1.40		SD=0.24	

Table 7. Physical status of the farmers based on household unit

Rohrer index	Household	Percent	Remarks
<1.09	2	0.3	thin
1.10～1.19	15	2.6	(24.4%)
1.20～1.29	126	21.5	
1.30～1.39	201	34.3	normal
1.40～1.49	136	23.2	(57.5%)
1.50～1.59	66	11.3	obese
1.60～1.69	29	4.9	(18.1%)
>1.70	11	1.9	
Total	603	100	

Relationship between related variables

[Analysis I]

Results of the relationship analysis between the individual/household characteristics and the dietary characteristics in 1982 and 1987 are summarizd in Table 8. Relationships between the balance of food intake and the individual/household characteristics, also the relationship of the balance of food intake with the education level of housewife, were consistently significant. And the relationship with the farming type and the geographical type were consistently insignificant, but with two other variables they were not consistent.

In terms of the cooking skill level, the relationships with the four individual/household characteristics with the exception of the income level were insignificant consistently between 1982 and 1987. The priority on cooking was significant consistently with the education level of housewife and the geographical type, and was not significant consistently with the farming type.

The frequency to market has a consistently significant relationship with the education level, the income level, and the geographical type, but has an insignificant relationship with the age. The mixed diet has an insignificant relationship consistentlly with the age, the education level, and the farming type.

Looking by column, it is noticeable that the education level of housewife has consistent relation-

Table 8. Relationships between individual/household characteristics and dietary characteristics

Dietary characteristics		Individual/Household characteristics				
		Age	Education	Income	Farming type	Geographical type
Balance of food intake	'87	*	*	**	NS	NS
	'82	NS	*	NS	NS	NS
	Ev	?	*	?	NS	NS
Cooking skill level	'87	NS	NS	NS	NS	NS
	'82	NS	NS	*	NS	NS
	Ev	NS	NS	?	NS	NS
Priority on cooking	'87	*	**	NS	NS	*
	'82	NS	**	**	NS	**
	Ev	?	**	?	NS	*
Frequency to market	'87	NS	**	**	*	**
	'82	NS	**	**	NS	**
	Ev	NS	**	**	?	**
Mixed diet with barley	'87	NS	NS	NS	NS	**
	'82	NS	NS	**	NS	NS
	Ev	NS	NS	?	NS	?

NS : Not significant *P<.05 **P<.01
Ev : Evaluation on comparison between '82 and '87
[in Line with Ev,
NS : Not significant at 5% in 1982 and 1987
* : Significant at 5% or 1% in 1982 and 1987
** : Significant at 1% in 1982 and 1987
? : Inconsistent between 1982 and 1987 result]

Table 9. Relationships between individual/household characteristics and nutrient intake level

Nutrient intake level		Individual/Household characteristics				
		Age	Education	Income	Farming type	Geographical type
Energy	'87	**	NS	NS	NS	NS
	'82	NS	**	NS	NS	NS
	Ev	?	?	NS	NS	NS
Protein	'87	**	NS	NS	NS	NS
	'82	NS	NS	*	NS	NS
	Ev	?	NS	?	NS	NS
Calcium	'87	**	NS	NS	NS	NS
	'82	**	**	NS	NS	**
	Ev	**	?	NS	NS	?
Iron	'87	**	NS	NS	NS	**
	'82	NS	NS	NS	NS	NS
	Ev	?	NS	NS	NS	?
Vitamin A	'87	NS	**	NS	NS	NS
	'82	NS	NS	NS	NS	**
	Ev	NS	?	NS	NS	?
Thiamin	'87	NS	NS	NS	*	NS
	'82	NS	NS	NS	NS	NS
	Ev	NS	NS	NS	?	NS
Riboflavin	'87	**	NS	NS	NS	NS
	'82	**	NS	*	NS	NS
	Ev	**	NS	?	NS	NS
Niacin	'87	**	NS	NS	NS	NS
	'82	NS	NS	NS	NS	NS
	Ev	?	NS	NS	NS	NS
Ascorbic acid	'87	NS	NS	NS	NS	NS
	'82	**	NS	NS	NS	NS
	Ev	?	NS	NS	NS	NS

NS : Not significant *$P<.05$ **$P<.01$

[in Line with Ev,
NS : Not significant at 5% in 1982 and 1987
* : Significant at 5% or 1% in 1982 and 1987
** : Significant at 1% in 1982 and 1987
? : Inconsistent between 1982 and 1987 result]

Table 11. Relationships between dietary characteristics and nutrient intake level

Nutrient intake level		Dietary characteristics				
		Balance of food intake	Cooking skill level	Priority on cooking	Frequency to market	Mixed diet with barley
Energy	'87	**	NS	NS	NS	NS
	'82	NS	NS	NS	*	**
	Ev	?	NS	NS	?	?
Protein	'87	**	NS	NS	NS	*
	'82	**	NS	NS	NS	NS
	Ev	**	NS	NS	NS	?
Calcium	'87	**	NS	NS	NS	*
	'82	NS	NS	NS	NS	NS
	Ev	?	NS	NS	NS	?
Iron	'87	NS	NS	NS	NS	NS
	'82	NS	NS	NS	NS	**
	Ev	NS	NS	NS	NS	?
Vitamin A	'87	*	*	NS	*	NS
	'82	NS	NS	NS	NS	NS
	Ev	?	?	NS	?	NS
Thiamin	'87	NS	NS	NS	NS	**
	'82	NS	NS	*	NS	**
	Ev	NS	NS	?	NS	**
Riboflavin	'87	**	NS	*	**	NS
	'82	NS	NS	NS	NS	NS
	Ev	?	NS	?	?	NS
Niacin	'87	NS	NS	NS	NS	NS
	'82	NS	NS	NS	NS	**
	Ev	NS	NS	NS	NS	?
Ascorbic acid	'87	NS	NS	NS	*	NS
	'82	*	NS	NS	NS	NS
	Ev	?	NS	NS	?	NS

[in Line with Ev,
NS : Not significant at 5% in 1982 and 1987
* : Significant at 5% or 1% in 1982 and 1987
** : Significant at 1% in 1982 and 1987
? : Inconsistent between 1982 and 1987 result]

ship with all dietary characteristics. Three of them were significant and two of them were insignificant.

[Analysis II]

The relationships between the individual/household characteristics and the nutrient intake level in 1982 and 1987 were compared in Table 9. On the whole, the consistently significant relationships were observed only between the age of housewife and the calcium intake level, as well as, riboflavin intake level. And most of the relationships were consistently insignicant. The relationship inconsistent between 1982 and 1987 were 14 relationships among 45.

In the row of nutrient intake level, thiamin, riboflavin, niacin, and ascorbic acid had a more consistent relationship with individual/household characteristics. In the column, the farming type had the highest consistent relationship with the nutrient intake level, and the age of housewife had the lowest consistent relationship.

Yoon[16] reported that energy intake and educational level, protein and income had a significant relationship. Meanwhile, Jung and Kim[38] reported that protein intake and income, protein and education level, and calcium and income had a significant relationship.

[Analysis III]

The relationship between individual/household characteristics as an independent variable and physical status as the dependent variable II in 1982

Significant relationships at 1% level were shown in the relationships of Rohrer Index and the age of housewife, and the Rohrer Index and the education level of housewife. Meanwhile, there was no significant relationship between the Rohrer Index was analyzed by x^2-test method. The x^2 values and the results of significance test on the relationship are presented in Table 10.
and the income level, the family type, and the geographical type.

[Analysis IV]

Relationships between the dietary characteristics and the nutrient intake level in 1982 and 1987 are presented in Table 11. Of the 45 relationships, only two relationships were consistently significant, the protein intake level and the balance of food intake, also the thiamin intake level and the mixed diet.

In the row of nutrient intake level, protein, iron, thiamin, and niacin had a more consistent relationship with dietary characteristics ; vitamin A and riboflavin had a less consistent relationship.

In the column of the dietary characteristics, the cooking skill level had a more consistent relationship with nutrient intake level, while the balance of food intake and the mixed diet had a less consistent relationship.

In the column of the dietary characteristics, the cooking skill level had a more consistent relationship with nutrient intake level, while the balance of food intake and the mixed diet had a less consistent relationship.

Table 10. Analysis on relationship between individual/household characteristics and physical status in 1982

Physical status		Individual/Household characteristics				
		Age	Education	Income	Farming type	Geographical type
Rohrer	X^2	52.76**	15.24*	2.05	7.42	10.27
index	df	6	6	4	6	6

*$P<0.05$ **$P<0.01$

Table 12. Analysis on relationship between dietary characteristics and physical status in 1982

Physical status		Dietary characteristics				
		Balance of food intake	Cooking skill level	Priority on cooking	Frequency to market	Mixed diet with barley
Rohrer	x^2	6.67	6.62	9.54	5.32	47.68**
index	df	4	4	8	6	4

**P<0.01

Table 13. Analysis on relationship between nutrient intake level and physical status in 1982

Physical status		Nutrient intake level								
		Energy	Protein	Calcium	Iron	Vitamin A	Thiamin	Riboflavin	Niacin	Ascorbic acid
Rohrer	F	4.92**	4.27*	10.39**	0.45	1.71	0.90	5.08**	6.06**	4.03*
index	df	551	551	551	551	551	551	551	551	551

*P<0.05 **P<0.01

[Analysis V]

The relationship between dietary characteristics and physical status was also analyzed by x^2-test. The x^2 values and the results of significance test are presented in Table 12. Only the Rohrer Index and the mixed diet with barley had a significant relationship.

[Analysis VI]

The relationship between nutrient intake level as the dependent variable I and physical status as the dependent variable II was analyzed by ANOVA test method. From the results shown on Table 13, the significant relationships at 1% level were those of the Rohrer Index and energy, calcium, riboflavin, and niacin intake level. And significant relationships at 5 percent were the relationships between the Rohrer Index and the protein and ascorbic acid intake level.

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한국 농민의 영양상태와 관련변인간의 관계분석

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요 약

우리나라 농민의 영양상태를 파악하여 농촌영양개선사업의 기초자료를 제공하기 위하여 실시된 이 조사연구는 구체적으로 농민의 식품 및 영양섭취상태와 그 변화를 파악하고 농민의 영양섭취수준 분포를 분석하며, 관련변인간의 관계를 분석하여, 나아가 식품영양에 관한 조사자료의 분석기법을 개발하는 데에 목적을 두었다. 이 연구에 이용된 자료는 1982년과 1987년 두차례에 걸쳐 표본농가 603호를 대상으로 하여 실측법에 의한 식품섭취량조사와 체위계측 및 설문면접조사에 의해 수집되었다. 영양섭취수준의 분포분석을 위해서는 SD, CV, Sk, Ku등이 이용되었고 관련변인간의 관련성 분석을 위해서는 x^2-test와 ANOVA 방법이 이용되었다. 이 연구의 주요결과를 요약하면 다음과 같다.

첫째 ; 농민의 식품섭취유형은 식물성식품에 의존하는 비중이 높으나 이러한 경향은 1982년의 1인1일당 식물성식품의 섭취량이 992.8g에서 1987년에는 946.4g으로 감소한 반면 동물성식품의 섭취량은 54.2g에서 91.3g으로 크게 증대함으로써 점차 개선되는 것으로 나타났다. 둘째 ; 농민의 영양소섭취수준은 평균치분석을 한 경우는 열량과 단백질의 섭취는 거의 권장량 수준에 이르고 있지만 calcium, vitamin A, ribofavin의 섭취는 상당히 부족한 반면, 철분, thiamin, niacin, ascorbic acid의 섭취는 과잉인 것으로 나타났다. 세째 ; 영양소섭취에 대한 분포분석에 있어서는 철분을 제외한 모든 영양소의 변이계수(CV)가 증가하였는데 이것은 바람직하지 못한 방향으로의 증가를 의미한다. 왜도(Sk)계수에 있어서는 약 절반에 해당하는 calcium, 철분, vitamin A, riboflavin, ascorbic acid등은 바람직한 방향으로, 나머지 절반은 바람직 하지 못한 방향으로 변화(감소)하였다. 또한 분포의 첨도(Ku)는 9개 영양소 가운데서 철분과 vitamin A만이 바람직한 방향으로의 변화(감소)를 나타냈다. 이것은 농민의 평균치에 의한 영양소섭취수준은 향상되고 있으나 그 분포는 바람직하지 못한 방향으로의 변화 즉, 분포가 고르지 못한 방향으로 변화하고 있다는 것으로 해석된다. 네째 : 관련변인간의 관계분석에 있어서는 115개의 관계 가운데서 76개가 1982년과 1987년 사이에 일관성 있는 관계를 나타냈으며 이 가운데서 10개의 관계만이 5% 수준에서 유의적인 관계를 나타내었다.