지 역 사 회 영 양 학 회 지 3(5) : 739~747, 1998
Korean J Community Nutrition 3(5) : 739~747, 1998

☐Original Article☐

A Comparison of the Dietary Habit and Nutrient Intakes of Korean Farmers according to Different Family Patterns and Farming Types*

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ABSTRACT

The purpose of this study was to compare the dietary habit and nutrient intakes of Korean farmers according to their different family patterns and farming types. Food and nutrient intakes were obtained by food frequency method. The subjects(male 35%, female 65% : mean age, 48±11 years) were composed 46% of nuclear family, 59% of 3-4 person of family size ; 50% of middle-scale farming ; 54% of rice farming. Sixteen percent were over 60 years old group. In aspects of dietary habit, farmers of medium size farming and 10-20 years of farming experience frequently skipped meals. But their appetite was better than small farm farmers. Dinner irregularity was more frequent in their group of 3-4 person families. The numbers of food intake were significantly different according to family pattern. Nuclear family groups consumed more kinds of foods. The mean energy intake was 2000Kcal/day, with PFC ratio of 19 : 16 : 65. The energy and nutrient intakes showed the same tendency as the food variety. Intakes of calcium and iron were lower than the Korean RDA. Families with over 5 people consumed higher amounts of protein and minerals. Intakes of thiamin, niacin, and vitamin E were better in large families and large-scale farming groups. As compared with the PMS ratio, the level of monounsaturated fatty acids as higher than saturated FA. The lipid intake was also better in large families and large-scale farming. The results suggest that dietary habit and nutrients intakes were different by family pattern and farming types. (*Korean J Community Nutrition* 3(5) : 739~747, 1998)

KEY WORDS : dietary habit · nutrient intakes · family pattern and farming types.

Introduction

There is widespread interest in the role of nutrition in general health and disease prevention. Dietary surveys in the Korean farmers(Hwangbo YS 1998 ; Lim WJ & Yoon JS 1997 ; Lee JH et al. 1994) have revealed two major trends : under consumption of vitamin A, riboflavin, and calcium and higher intakes of rice and salts than the recommended level. The intake of a nutritionally well-balanced diet is essential for maintaining good health and increasing productivity of the physical work necessary for farming. The demanding physical labor requires

*The present study was supported by a fund from the ministry of Health and Welfare in 1997

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more electrolytes, water, and energy than other nutrients(Paige 1988). However findings from the national nutrition survey(Ministry of Health & Welfare 1996) confirm that nutrient intakes of rural persons fall short of the RDAs established by the Korean Nutrition Society.

Dietary habits were determined by the culture of society(Holm 1993), family pattern and the types of agriculture. Considerable speculation has centered on the influence of living alone upon one's diet (Axelson ML & Penfield MJ 1983 ; Gerrior SA et al. 1995). Concern has largely been raised from the belief that eating is a social and emotional activity (Linderman AK & Clancy KL 1990) ; being alone means that eating becomes more of an obligation than an opportunity for social interaction. There have been few studies regarding the effect of the lack of social contact on dietary intake and habits. Living alone or in a small family is considered to be associated with the poor nutrient intakes of farmers.

Eating habits are ingrained in societies and families. Despite the availability of food, customary practice and deliberate deviations of dietary intakes can result in sub-clinical or obvious deficiencies. The importance of observing the current eating habits and their relation to health is that it should be the first step for appropriate interventions in terms of nutrition policy, education and supplementation programs. Nutrition is established as an important factor that impinges the immunity and the risk of infection.

In this respect, it seems necessary to investigate dietary habit and nutrient intakes in various different family patterns and agricultural types of Korean farmers. The objectives of the present study are to examine the nutrients and nutrition problems related with poor dietary habits. These provide foundations for nutrition education for farmers and give some advise on the diet management for different farming types.

Subjects and Methods

Eight hundred farmers were selected from 8 provinces with stratified cluster sampling, 100 subjects from each province, with an interview method conducted by home extension agents of Rural Development Administration. The extreme values of nutrient intakes(over 4000kcal/day, under 800kcal/day) were omitted, and the data from 644 subjects were analyzed. The family patterns and farming types were investigated as the main factors of dietary habits and nutrient intakes. The semi-quantitative food frequency method, which estimates the intake of 65 foods (Paik et al. 1995) was used to measure the nutrient intakes of the subjects.

The data were analyzed by using SAS programs ; the results expressed the mean and standard deviation of nutrient intakes, and the frequency and percentages of distribution. F-value and chi-square analyses assessed the differences between groups. Multiple regression was done to estimate family factor relation to each nutrient intake.

Results and Discussion

1. The characteristics of family and farming types of the subjects

Demographic data showed that the most of the farmers were in their forties, accounting for 36.9% of the subjects. With the respect to the family pattern of the households, 46.0% were from nuclear families, 20.7% were only composed of a couple, and 21.1% were in a large family. Over half(59.3%) of the farmers families were composed of 3－4 persons. Alone and couple families were composed mostly 40 years of age. Compared to another study of Kyunggi(Kim 1997), the percentage of nuclear families this study was lower than 70.9%. The 20.8% of families with under 2 members was also lower than the 47.3% result of Park(1997). The gender profile of this study was 36.9% male are 64.9% female.

Agricultural background showed that of the respondents were from medium-sized farms and 54% were rice planters. This percentage of rice planting was lower compared to the previous report(67.6% ; Park 1997). The farming type and farming size were compared with family patterns as shown in table 2. The proportion of work in rice planting as trad-

Table 1. Age and sex distributions of the subjects by family pattern and family size Unit : frequency(column %)

		Family pattern					No. of people in family			Total
		Alone	Couple	Nuclear	Large	Others	under 3	3 – 4	over 5	
Age	>30	0(0)	1(1)	4(1)	10(5)	0(0)	1(1)	4(2)	10(4)	15(2.3)
	30th	0(0)	2(2)	83(28)	68(37)	4(27)	2(2)	61(27)	94(34)	157(24.5)
	40th	1(8)	28(21)	118(40)	84(45)	5(33)	22(16)	88(38)	126(45)	236(36.9)
	50th	1(8)	49(37)	62(21)	17(9)	4(27)	48(36)	53(23)	32(12)	133(20.8)
	60th	8(67)	43(32)	24(8)	7(4)	2(13)	49(37)	22(10)	13(5)	84(13.1)
	70<	2(17)	10(8)	4(1)	0(0)	0(0)	11(8)	2(1)	3(1)	16(2.5)
			Df=20 χ^2=211.6 p<0.001				df=10 χ^2=187.0 p<0.001			
Gender	Male	4(33)	60(45)	107(36)	52(28)	3(20)	60(45)	94(41)	72(26)	226(35.1)
	Female	8(67)	73(55)	189(64)	136(72)	12(80)	73(55)	137(59)	208(74)	418(64.9)
			df=4 χ^2=12.2 p<0.05				df=2 χ^2=19.9 p<0.001			
	Total	12(1.9)	133(20.7)	296(46.0)	188(20.2)	15(2.3)	133(20.8)	230(35.9)	278(43.4)	644(100)

Table 2. The distributions of farming status by different family patterns of the subjects Unit : frequency(column %)

		Size of farming			Type of farming					Duration of farm(yr.)			Total
		Large	Medium	Small	Rice	Livestock	horticulture	Orchard	Others	under10	10 – 20	over 20	
Family	Alone	0(0)	1(0)	11(5)	10(3)	0(0)	1(1)	0(0)	1(1)	2(3)	0(0)	10(3)	12(2)
pattern	Couple	11(15)	62(18)	60(26)	95(27)	9(14)	9(12)	10(15)	10(11)	7(11)	6(3)	120(30)	133(20)
	Nuclear	38(52)	160(47)	98(42)	153(44)	35(55)	36(47)	30(46)	42(46)	28(42)	93(52)	175(44)	296(46)
	Large	24(33)	106(31)	58(25)	81(23)	20(31)	29(38)	22(34)	36(40)	29(44)	74(42)	85(21)	188(29)
	Others	0(0)	9(3)	6(3)	9(3)	0(0)	1(1)	3(5)	2(2)	0(0)	5(3)	10(3)	8(1)
	Sig.	χ^2=26.7 p<0.001			Df=16 χ^2=36.3 p<0.01					Df=8 χ^2=77.4 p<0.001			
No. of	Under 3	11(15)	57(17)	65(28)	103(30)	7(11)	7(9)	7(11)	9(10)	8(12)	6(3)	119(30)	133(21)
family	3 – 4	24(33)	119(35)	88(38)	121(35)	23(36)	32(42)	25(39)	30(33)	25(38)	75(42)	131(33)	231(36)
	Over 5	38(52)	162(48)	80(34)	124(36)	34(53)	37(49)	33(51)	52(57)	33(50)	97(54)	150(38)	280(43)
	Sig.	Df=4 χ^2=17.1 p<0.01			df=8 χ^2=42.2 p<0.001					Df=4 χ^2=56.1 p<0.001			
	Total	73(11)	338(53)	233(36)	348(54)	64(10)	76(12)	65(10)	91(14)	66(10)	178(28)	400(62)	644(100)

itional farming types was 83.5% in alone and 72.5% in couple families(10 of 12 alone families and 95 of 133 couple families), but special commercial farming such as horticulture, orchard, and others were common among nuclear and large families. sixty two percentage of the farmers have worked in agriculture over 20 years.

2. Dietary habits of the subjects

Skipping meals was frequent for farmers who have worked 10 – 20 years, and those who owned medium sized farm. This is somewhat consistent with the finding that the sense of hunger was significantly suppressed during and after intense exercise(King et al 1994). It suggests that farming work is so stressful that formers forget the time for meals. But the appetite of farmers was not significantly different among the farming and family groups.

The distribution in meal regularity according to family pattern and size was shown in Table 4. Subjects of large family(over 5 persons) had a significantly irregular pattern of eating dinner than those of small families. But the subjects with farms size with large farms ate breakfast more regularly than those of other farm sizes.

There is epidemiological, and clinical evidence showing the effects of alcohol and smoke on health. Alcoholic patients complain of gastro-intestinal symptoms, with the degree varity depending on acute and chronic consumption. That situation accelerates malabsorption of nutrients(Hill 1989). Alcohol consumption and smoking habits are shown in table 5. Subjects were classified into non- drinkers, moderate, and heavy drinkers. Higher intake of alcohol(over

Table 3. The comparison of skipping meals and appetites by family size and farming characteristics

		skip meals				Appetite					Total
		Non	Breakfast	Lunch	Dinner	Excellent	Good	Normal	Poor	Very poor	
Total		414(64)	129(20)	61(10)	40(6)	90(14)	251(39)	278(43)	22(3)	3(0)	644(100)
Family size	Under 3	92(22)	20(16)	16(26)	5(13)	18(20)	49(20)	58(21)	7(32)	1(33)	133(21)
	3-4persons	144(35)	51(40)	19(31)	17(43)	33(37)	105(42)	84(30)	8(36)	1(33)	231(36)
	Over 5	178(43)	58(45)	26(43)	18(45)	39(43)	97(39)	136(49)	7(32)	1(33)	280(44)
		df=6 χ^2=5.96 ns				df=8 χ^2=0.02 ns					
Farming size	Large	57(14)	6(5)	4(6)	6(15)	13(14)	32(13)	7(10)	1(5)	0(0)	73(11)
	Medium	218(53)	76(59)	27(44)	17(43)	46(51)	139(55)	142(51)	9(41)	2(67)	38(53)
	Small	139(34)	47(36)	30(49)	17(43)	31(34)	80(32)	109(39)	12(55)	1(33)	233(36)
	Sig.	Df=6 χ^2=15.58 p<0.05				df=8 χ^2=8.43 ns					
Farming duration	Under10	38(9)	15(12)	7(12)	6(15)	7(8)	26(10)	31(11)	2(9)	0(0)	66(10)
	10-20years	103(25)	46(36)	12(20)	17(43)	28(31)	74(29)	69(25)	7(32)	0(0)	178(28)
	Over20	273(66)	68(53)	42(69)	17(43)	55(61)	151(60)	178(64)	13(59)	3(100)	400(62)
	Sig.	Df=6 χ^2=16.15 p<0.05				df=8 χ^2=0.14 ns					

Table 4. The comparison of meal regularity by family and farming types

		Breakfast		lunch		Dinner	
		Regular	Irregular	Regular	Irregular	Regular	Irregular
		517(81)	121(19)	500(79)	130(21)	523(83)	106(17)
Family size	Under2 persons	116(22)	17(14)	109(22)	24(18)	117(22)	15(14)
	3-4persons	178(34)	52(43)	178(36)	50(38)	179(34)	49(46)
	Over5persons	223(43)	52(43)	213(43)	56(43)	227(43)	42(40)
	Sig.	df=2 χ^2=5.3 ns		df=2 χ^2=0.78 ns		df=2 χ^2=6.63 p<0.05	
Farming size	Large	67(13)	5(4)	58(12)	12(9)	59(11)	12(11)
	Medium	262(51)	73(60)	267(53)	65(50)	272(52)	60(57)
	Small	188(36)	43(36)	175(35)	53(41)	192(37)	34(32)
	Sig.	df=2 χ^2=8.53 p<0.05		df=2 χ^2=1.70 ns		Df=2 χ^2=0.88 ns	

half a bottle of Soju per day) was 9.6%. There were not any significant differences among the groups based upon family pattern and farming types. The classification of smoking habit was non-smoker(73.0%), moderate(15.2%), and heavy smoker. 11.8% of the subjects were heavy smoker(over 20 cigarettes per day). The subjects of large families(more than 5 persons) and subjects farming less than 10 years duration smoked less than subjects in other groups. The alcohol consumption was not significantly different according to family size. A strong relation between alcohol consumption, smoking and energy intakes was described(Veenstra et al. 1993). This concern requires further study in order to ameliorate farmer's health. The subjects of large families smoked less and had health foods more frequently than other groups. Dietary supplementation of farmers was suggested to be a wasteful and often inappropriate or unnecessary practice. Nutrition education should be aimed to reduce misconceptions regarding relationships between nutrients, and to discourage the unnecessary use of supplements. Situations do exist, however when suitable supplementation which provides a means for balancing the nutritional deficiency caused by rigorous farm work. Further consumption of health food would be done after an evaluation of the situation in which supplements are needed.

3. Intake of nutrients and food kinds by different farming types and family patterns

Table 6, 7 and 8 compared the nutrient intakes of different farming types and family patterns. Accor-

Table 5. The frequency of health food, smoking and alcohol consumption by family and farming characteristics

Unit : frequency(column %)

		health food		Smoke			Alcohol drink		
		eat	Non	Non	a little	Much	non	A little	Much
Total		242(38)	402(62)	470(73)	98(15)	76(12)	380(59.0)	203(31.5)	61(9.5)
Family size	Under 2	61(25)	72(18)	90(19)	22(22)	21(28)	80(21)	40(20)	13(21)
	3-4persons	92(38)	139(35)	158(34)	40(41)	33(43)	132(35)	70(34)	29(48)
	Over 5	89(37)	191(48)	222(47)	36(37)	22(29)	168(44)	93(46)	19(31)
		df=2 χ^2=8.40 p<0.05		Df=4 χ^2=11.24 p<0.05			df=4 χ^2=5.13 ns		
Farming size	Large	27(11)	46(11)	55(12)	9(9)	9(12)	38(10)	29(14)	6(10)
	Medium	119(49)	219(54)	238(51)	56(57)	44(58)	204(54)	101(50)	33(54)
	Small	96(40)	137(34)	177(38)	33(34)	23(30)	138(36)	73(36)	22(36)
	Sig.	Df=2 χ^2=2.13 ns		df=4 χ^2=2.80 ns			Df=4 χ^2=2.71 ns		
Farming duration	Under10years	27(11)	39(10)	54(11)	6(6)	6(8)	37(10)	26(13)	3(5)
	10 - 20years	58(24)	120(30)	144(31)	15(15)	19(25)	106(28)	51(25)	21(34)
	Over20years	157(65)	243(60)	272(58)	77(79)	51(67)	237(62)	126(62)	37(61)
	Sig.	Df=2 χ^2=2.68 ns		Df=4 χ^2=15.8 p<0.01			Df=4 χ^2=4.60 ns		

Table 6. *The intakes of energy, minerals and kinds of food different families and farm size of subjects*

Unit : mean±SD

Intake of nutrients and food		Kinds of food (sorts/year)	Energy (Kcal/day)	Protein (g/day)	Calcium (mg/day)	Iron (mg/day)
Total mean		49.9±8.9	2000±490	97±58	611±323	12.5±5.5
Family patterns	Alone	49.6±8.3	1804±429	72±33	491±423	10.0±4.9
	Couple	46.8±9.6	1855±454	88±59	556±350	11.6±5.5
	Nuclear	51.5±8.5	2019±476	101±58	627±330	12.8±5.6
	Large	49.7±8.8	2092±519	99±57	640±286	13.1±5.4
	Others	52.6±5.6	2165±514	107±54	527±205	12.4±4.7
	Sig.	F=5.24 p<0.001	F=3.12 p<0.01	F=1.61 ns	F=0.81 ns	F=0.95 ns
Family size	Under 2	46.9±9.5	1837±452	84±57	525±334	11.1±5.4
	3 - 4 persons	51.6±8.5	2023±492	98±53	619±309	12.7±5.3
	Over 5	50.0±8.6	2101±488	108±69	678±335	13.6±6.0
	Sig.	F=3.00 ns	F=10.4 p<0.01	F=5.39 p<0.01	F=4.9 p<0.01	F=5.24 p<0.01
Farming size	Large	50.0±9.4	2137±461	118±84	656±329	13.6±5.8
	Medium	50.4±9.1	2006±502	96±55	615±320	12.6±5.6
	Small	49.2±8.5	1950±475	91±50	592±324	12.1±5.2
	Sig.	F=0.42 ns	F=0.19 ns	F=7.08 p<0.01	F=1.00 ns	F=1.93 ns

ding to Table 6, daily intakes of protein, calcium, and iron were not significantly different by family pattern and size. Energy intake, however, was different ; the intake of a small family was particularly low. The energy intakes of farmers were 2,000kcal on average. Furthermore, the energy intake would be estimated to be above recommended level for farmers with marked more physical activity ; it was lowered in the family of single individual and couples. In view of the lower prevalence of obesity among farmers, actual energy intakes were low in relation to the activity levels of farming work. The farmers consumed 50 kinds of food annually. This varied a significantly with family patterns. More sorts of foods were consumed by the subjects in nuclear families.

The average ratio of PFC(protein, fat and carbohydrate) to total calories in all subjects was 19.8 : 18. 9 : 61.7, similar to the results of National Survey

(Ministry of Health & Welfare 1996). The subjects of this study consumed more protein than RDA in quantity. This trend showed a higher increase in fat intakes than that of the 1980s(Moon et al. 1991), approaching that of the western PFC ratio.

The protein intake was not low in quantity, and there were no significant differences in protein intake by family pattern and farming types. But the family size influenced the level of protein, calcium and iron intakes. It has been suggested that many family numbers living together could have more opportuni-ty for protein and mineral intakes. Protein is not a problem among farmers but calcium and iron were significantly lower in the group of families consisting of fewer than 2 perople.

A habitualty high calcium intake may prevent the development of osteoporosis by increasing adult peak bone mass and to slow age related bone loss. The dietary mean calcium intake was lower than 800mg of Korean RDAs(1996). On the basis of the factorial method, Schaafsma et al.(1989) had estimated the amounts of calcium needed. According to Schaafsma et al.(1989), men and women beyond the age of 20s are recommended 700-900mg of calcium daily ; adults beyond the age of 50 years should not consume less than 800 to 1000mg/day. But in Chinese women, the mean daily intake without calcium supplementation 391-398mg/day was according to methods(Hains et al. 1994).

The intakes of vitamins were shown in Table 7. The intakes of thiamin and riboflavin were 1.2mg/day, 1.1mg/day respectively, which were not different as in the 1980s(Moon et al. 1991). Small families had low intakes of riboflavin, niacin, and vitamin E. Riboflavin deficiency is widely seen as a micro-nutrients problem in many developing countries, where meat and dairy products are scarce. Indeed there are no rich sources of riboflavin in rural area. The intake of riboflavin within this study was lower than the RDA for Koreans(1996), especially within the families with less than 2 members as well as among people working on medium and small farms. The same problem was seen in the intake of thiamin, niacin, and vitamin E.

Higher lipid intakes by large families can be explained by their higher intake of foods. It could be said that family size influences nutrients intake and good health. This trend continued for most other nutrients for good health of farmers. SFA(Saturated fatty acids) accounted for 10% of the energy intakes recommended by a US Senate select committee on Nutrition and Human needs(Horwath 1989). The intake of SFA by farmers was low at only 5.6%. The intake of fatty acid composition created a PMS(polyunsaturated fatty acids, monounsaturated fatty acids and saturated fatty acids) ratio of 9.1 : 13.6 : 12.5g/

Table 7. The intakes of vitamins by different families and farming size of subjects Unit : mean±SD

		Thiamin(mg)	Riboflavin(mg)	Niacin(mg)	Pyridoxine(mg)	Vitamin E(T.E)
Total mean±SD		1.2±0.5	1.1±0.5	15.6±6.7	1.3±0.5	8.7±4.8
Family patterns	Alone	1.0±0.3	0.9±0.5	12.4±4.5	1.2±0.3	6.7±2.5
	Couple	1.0±0.5	0.9±0.4	14.0±6.1	1.2±0.5	7.9±4.3
	Nuclear	1.2±0.5	1.1±0.5	15.9±6.7	1.3±0.5	8.5±4.5
	Large	1.3±0.5	1.2±0.5	16.7±7.4	1.4±0.5	9.5±5.2
	Others	1.3±0.6	1.1±0.5	15.1±5.5	1.3±0.4	12.6±6.9
	Sig.	F=2.44 p<0.05	F=1.98 ns	F=2.72 p<0.05	F=2.39 p<0.05	F=1.63 ns
Numbers of family	Under 3	1.0±0.4	0.9±0.4	13.5±5.9	1.2±0.4	7.6±4.3
	3-4 persons	1.3±0.5	1.1±0.5	16.0±6.7	1.3±0.5	8.8±4.8
	Over 5	1.3±0.5	1.2±0.5	16.9±7.3	1.4±0.5	9.5±4.8
	Sig.	F=11.4 p<0.01	F=12.5 p<0.01	F=10.9 p<0.01	F=8.35 p<0.01	F=5.86 p<0.01
Farming size	Large	1.3±0.5	1.2±0.5	17.3±7.2	1.4±0.5	10.3±5.4
	Medium	1.2±0.5	1.1±0.5	15.7±6.8	1.3±0.5	8.6±4.8
	Small	1.2±0.5	1.1±0.5	15.0±6.5	1.3±0.5	8.3±4.3
	Sig.	F=3.03 p<0.05	F=6.04 p<0.01	F=3.45 p<0.05	F=2.71 ns	F=11.26 p<0.01

Table 8. The lipids intakes according to the different families and farming size(mean±SD)

		Cholesterol (mg/day)	Lipids (g/day)	TFA (g/day)	SFA (mg/day)	MUFA (g/day)	PUFA (g/day)
Total		235±159	40.2±21.8	35.2±19.3	12.5±7.4	13.6±8.3	9.1±4.5
Family patterns	Alone	203±211	32.7±17.2	28.5±15.0	9.8±5.8	10.6±5.7	8.1±3.9
	Couple	201±140	34.7±19.4	30.4±17.2	10.6±6.9	11.8±70.8	8.0±3.6
	Nuclear	243±153	40.8±21.9	35.8±19.5	12.8±7.5	13.9±8.3	9.1±4.6
	Large	250±175	13.8±19.6	38.5±20.1	13.7±7.5	14.9±8.7	9.9±4.8
	Others	234±168	41.0±19.6	36.4±17.7	12.1±6.0	13.7±7.2	10.6±5.0
	Sig.	F=1.28 ns	F=2.66 p<0.05	F=2.71 p<0.05	F=3.02 p<0.05	F=2.87 p<0.05	F=1.33 ns
Family size	Under 3	193±138	33.1±18.8	29.0±16.6	10.0±6.5	11.2±7.5	7.8±3.7
	3-4 persons	243±159	41.6±21.9	36.5±19.4	13.0±7.4	14.1±8.3	9.4±4.7
	Over 5	255±172	43.1±22.8	37.8±20.2	13.5±7.7	14.6±8.8	9.7±4.6
	Sig.	F=8.17 p<0.01	F=10.4 p<0.01	F=10.4 p<0.01	F=10.8 p<0.01	F=9.33 p<0.01	F=7.4 p<0.01
Farming size	Large	276.7±180.1	45.0±21.9	39.4±19.3	14.0±7.4	15.3±8.4	10.1±4.4
	Medium	235.8±157.6	40.4±21.9	35.5±19.3	12.5±7.4	13.7±8.3	9.2±4.7
	Small	219.9±152.3	38.3±21.5	33.6±19.1	11.9±7.4	13.0±8.2	8.7±4.2
	Sig.	F=3.24 p<0.05	F=3.94 p<0.05	F=4.00 p<0.05	F=3.57 p<0.05	F=3.36 p<0.05	F=4.25 p<0.05

TFA : total fatty acids SFA : saturated fatty acids MUFA : mono-unsaturated fatty acids PUFA : poly-unsaturated fatty acids

Table 9. Regression of nutrient intakes on the family and farming characteristics

Nutrient	Factor	Partial R^2	F-value	P	Nutrients	Factors	Partial R^2	F-value	P
No. foods	Dur.fm	0.017	11.77	0.0006	Thiamin	Age	0.048	32.48	0.0001
Energy	Age	0.050	33.64	0.001		No.fmy	0.011	7.24	0.0073
	No.fmy	0.007	4.47	0.035	Riboflavin	Age	0.078	54.23	0.0001
Protein	No.fmy	0.023	14.76	0.0001		No.fmy	0.008	5.27	0.0221
	Age	0.007	4.51	0.034	Niacin	No.fmy	0.033	22.17	0.0001
Fat	Age	0.066	45.31	0.0001		Age	0.010	6.89	0.0089
	No.fmy	0.006	4.29	0.0387	Pyridoxine	No.fmy	0.025	16.76	0.0001
CHO*	Age	0.044	29.50	0.0001	Vit.E	Age	0.021	13.88	0.0002
	No.fmy	0.004	2.82	0.0933		No.fmy	0.007	4.76	0.0295
Ca	Age	0.032	21.34	0.0001	Chol**	dur.fm	0.031	20.35	0.0001
	No.fmy	0.010	6.47	0.0112		No.fmy	0.008	5.61	0.0182
P	Age	0.040	26.38	0.0001	TFA	Age	0.042	28.13	0.0001
	No.fmy	0.014	9.72	0.0019		No.fmy	0.007	4.78	0.0291
Fe	No.fmy	0.027	17.44	0.0001	SFA	Age	0.045	30.31	0.0001
	Age	0.007	4.90	0.0272		No.fmy	0.007	4.78	0.0292
K	No.fmy	0.030	20.02	0.0001	MUFA	Age	0.032	20.97	0.0001
	Age	0.010	6.35	0.0120		No.fmy	0.006	3.83	0.0509
Vit.A	No.fmy	0.009	5.68	0.0175	PUFA	Age	0.040	26.42	0.0001
Retinol	Age	0.059	40.22	0.0001		No.fmy	0.009	5.86	0.0158
Carotene	No.fmy	0.007	4.62	0.0320	D.fib***	No.fmy	0.016	10.47	0.0013
Vit.C	No.fmy	0.013	8.48	0.0037	C F****	No.fmy	0.016	10.35	0.0014

No.fmy : persons of family, dur.fm : duration of farming
*CHO : carbohydrate, **Chol : cholesterol, ***D.fib : deitary fiber, ****C F : crude fiber

day. This means that the intake of SFA was low and MUFA(monounsaturated fatty acids) was high. The high intakes of unsaturated fatty acids could increase the lipid peroxide contents(Kim and Choi, 1992), more vitamin E is therefore needed an antioxidant. And the prevalence of cancer would need to be observed carefully.

The significance of cholesterol intake as a contributor to chronic diseases has become a more prevalent concern in recent years. The mean intake of cholesterol of farmers was 235mg/day ; the cholesterol intake in all groups was lower than that of the US daily goal of 300mg(Horwath 1989). The evidence linking dietary SFA and plasma cholesterol with controlled modified diets was demonstrated that plasma cholesterol concentration responds to diet(Young 1986). But we could suggest that the subjects of this study had no problem with the cholesterol contents of plasma because of low intake.

4. The effects of demographic variables on the nutrient intakes

Regression models were developed to assess the independent effects of demographic variables on each of the nutrient intakes. The family factors influencing on nutrient intakes were family size and age. The size of the family was significantly related to the nutrient intakes. And age was inversely related to the intakes of nutrients. The durations of farming, farming size, family pattern, and farming types were not significantly related to the nutrient intakes of farmers. The regression models were formulated separately with each nutrient(data not shown), but partial R^2(model R^2) score were very low.

Summary and Conclusion

The sample family characteristics of farming life were described. Subjects were mainly composed of those who were in their thirties and forties. Fifty year olds tended to live only as couples in their family. Living alone was more common for females rather than males. The main farming type was rice planting, and it was different according to age groups. Younger groups most often selected income farming, such as livestock and horticulture.

In aspects of dietary habits, farmers who worked either on medium sized farms or for 10-20 years frequently skipped meals. But appetite was not significantly different among different farm sizes. Dinner irregular it was more frequent families with 3-4 members. The numbers of food intake were significantly different by family pattern and farming types. Large families and large-scale farming groups consumed more kinds of foods.

The mean energy intake of farmers was 2000Kcal/day, with a PFC ratio of 19 : 16 : 65. Intakes of calcium and iron were lower than the KRDA, but large family groups ate higher quantities of minerals. Intakes of riboflavin, niacin, and vitamin E were higher in large families and large-scale farming groups. As compared to the PMS ratio, monounsaturated fatty acids were higher than saturated FA. The lipid intake was also higher in large families and in large-scale farms.

The results suggest that dietary habits and nutrient intakes were different by family pattern and farming scales. The main conclusion of this study can be summarized as follows. The large families, large-scale farms represented the best nutritional conditions for Korean farmers. These situations seem to be make farmers healthy. But family trends are difficult to change : in modern society where families are comprised of either couples or by nuclear members. We suppose that farming system should be a kind of collateral family. If the tendency of families and farms can't change, that the nutrition education will be necessary to ameliorate dietary habits and nutrients intakes for better health for of Korean farmers.

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