

The Changes and Suggestions in Korean Dietary Guideline

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ABSTRACT

The Recommended Dietary Allowances(RDAs, Nutrient standards), dietary guidelines, and food guides, each define aspects for a healthy diet in different ways. The RDA and food guide for Koreans were first established in 1962 by the Food and Nutrition Committee of the Korea FAO Association. The committee released the RDA and suggested ways to intake the recommended nutrients. Every five years, the committee has added more data and released revisions. The latest edition of the RDA is the 6th revision. In the beginning, the concept of basic food groups was emphasized as basic data for planning menus based on RDA. In the 5th revision, the basic food groups and dietary guideline were included in order to prevent nutritional deficiencies and excesses. The latest dietary guideline for public health from the Ministry of Health and Welfairs(December, 1990) suggests that, 1) Eat a variety of foods with a recommended fat intake equaling or less than 20% of total calories ; 2) Maintain ideal body weight and prevent obesity ; 3) Eat foods low in salt. Salt intake should not exceed 10g ; 4) Do not drink too much ; 5) Eat regularly and enjoy meals. After these guidelines were established, the first nutritional education efforts made by the government, included the dietary guidelines for public diet. The practical dietary guidelines were developed in 1984. Despite broad possibilities for application, they had limited use, mainly as a nutritional assessment and food balance sheet preparation. They were not well utilized in public nutritional education and nutritional policy through the media because of the weakness of the government's food and nutrition policy. Also a lack of administrative support and dietitians in the health department and administrative organizations was partly to blame. In regard to public health and nutrition status, life expectancy has increased 10 years since the 70's and the elderly population increased threefold in 1995 compared to 1960. The common causes of death in 1996 by 19 Chapters classification, were first disease of the circulatory system ; the second, neoplasms ; the third, external causes of mortality ; the fourth, diseases of the digestive system ; and the fifth, respiratory system diseases, In food intake, grain and complex starch intake has decreased while fruit and animal foods have considerably increased. Therefore, energy from carbohydrates has decreased while energy from protein and fat has increased. Energy intakes from protein, fat and carbohydrates were respectively 12.5, 7.2 and 80.3% in 1969 but 16.1, 19.1 and 64.8% in 1995. 62.9% of the households had the fat energy less than 20%, while 37.1% had the fat energy above 20%. The only intakes of vitamin A and calcium were below RDA levels.

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Therefore, nationwide attention should be focused on public nutrition education and public activities with supplementation of the RDAs, according to the food guide and the dietary guideline. (*Korean J Community Nutrition* 3(5) : 748~758, 1998)

KEY WORDS : RDAs · dietary guidelines · food guide · RDI.

Introduction

Recommended Dietary Allowances(RDAs, Nutrient standards), dietary guidelines, and food guides define aspects of healthful diet in different ways(Fig. 1).

RDAs are defined as the average daily amounts of essential nutrients estimated on the basis of available scientific knowledge to be sufficiently high to meet the physiological needs of nearly all healthy persons. Dietary guidelines are often expressed in relation to the total diet and in qualitative terms, e.g., to eat more ; and they are intended for the public directly or indirectly through educators, health professionals, and policy makers. Food guides provide a conceptual framework for selecting the kinds and amounts of foods of various types that contribute to a nutritionally satisfactory diet(KRDA 1962, 1967, 1975, 1980, 1985, 1989, 1995). In Korea, science-based food guides were first published with RDAs in 1962.

The Food and Nutrition Committee of the Korea FAO Association first established a RDA and food guide for Koreans in 1962. Although there was not enough information at the time, the committee released the RDA and suggested ways to intake the recommended nutrients ; i.e. introduced the five basic food groups and food intake levels. Every five years, the committee has added more data and released revisions. The latest edition of the RDA is the 6th revision(KRDA, 1995). In the beginning, the concept of basic food groups was emphasized as basic data for planning menus based on RDA. In the 5th re-

vision, the basic food groups and dietary guidelines were included in order to prevent nutritional deficiencies and excesses. From now on, the changes and characteristics of RDA, food guide, and dietary guideline for Koreans will be reviewed and the changes of food and nutrient intakes will be examined.

1. Change of recommended dietary allowances (RDAs) for Koreans

RDAs were first established in 1962 by the Korea FAO Association in the interests of improving public health, physical growth, food supply, dietary improvement, and human resources. Since the RDAs were based on physical standards, food consumption (intake) patterns, dietary habits, lifestyle, socioeconomic status, and physical activities, there have been many revisions(1967, 1975, 1980, 1985, 1989, 1995). The 7th revision is now being prepared. RDA is often related to the recommended dietary intake (RDI) and is defined as "The recommended intake sufficient to meet the needs of all healthy individuals". The 1st to 4th revisions of the RDA were released by the Korean FAO Associations. The 5th revision was done by the Korea Institute for Population and Health(KIPH). Though the 6th revision was officially supervised by the Korea Institute for Health and Social Affairs(formerly KIPH), it was in fact undertaken by the Korean Nutrition Society (KRDA 1962, 1967, 1975, 1980, 1985, 1989, 1995, KIHSA, 1985, 1989). Table 1 shows the changes in RDA for adult males and females.

1) Physical Standards

In the 1st edition and 1st revision, the physical standards were defined for a 25-year-old healthy adult who was moderately active. In the subsequent edition, the age was defined in broader age groups (namely 20 to 49 years, 20 to 29 years or 20 to 24 years), in recognition of the socioeconomic develop-

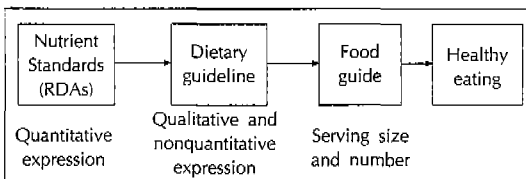


Fig. 1. The relationship of RDA, dietary guideline and food guides to healthy eating(modified, Welsh, 1996).

ment and gradual improvement in Koreans' diet. These same improvements have caused the physical standards to increase over time as well.

2) Energy

When the 1st edition was released, Korean industry was based on manpower and Korea was in the beginning stages of industrialization. In establishing the RDA, the committee placed emphasis on the intake needed to sustain an active labor. In the 1st edition, they decided on 2,900 kcal for adult males and 2,200kcal for adult females. In the 1st revision, considering the increase in physical standards, they raised the figure to 3,000kcal for adult males but left the adult female figure unchanged. In the 2nd revision, as daily life became more automated and nutritional problems increased the intake was decreased by 300kcal for adult males, 200kcal for adult females, and 500kcal for lactating women. In the 3rd revision, they detailed energy supplements for pregnant-lactating women : 150kcal for the first half of pregnancy, 250kcal for the second half of pregnancy, and 800kcal for the lactating period. In the 4th revision, they recommended a 40kcal/kg decrease, 2,500kcal for adult males and 2,000kcal for adult females.

In spite of increasing height and ideal body weight, the reduced RDA is based on economic development and the automatization of daily life. The intake for pregnant women increased to 300kcal and for lactating women, 700kcal. In the 5th revision, although physical standards increased, the recommended intake decrease was 39kcal/kg, 2,500kcal for adult males and 2,000kcal for adult females. Intake during pregnancy was divided into two parts : the first half suggested a surplus of 150kcal and second half at 350kcal. Current recommendation is available in the 6th revision. Energy recommendation was decided by measuring the resting energy expenditure against physical activity. The energy recommendation decreased to 38kcal/kg but the total energy intake remained constant while physical standards increased. The energy supplementation for lactating women decreased by up to 500kcal regarding the amount of milk produced, energy needs during lactation, and

the mother's body fat content.

3) Nutrients

The recommended daily nutrients from the 1st edition to 4th revisions, depended upon the energy, protein, vitamin A, B₁, B₂, C, D, Niacin, Ca, Fe. In the 5th revision, another five elements were included, i.e. vitamin E, B₆, Folic acid, P, and Zn. The protein recommendation in the 1st edition was 70g for adult males, 65g for adult females and increased to 80g for adult males, 70g for adult females in the 1st revision. There were no changes to the 3rd revision. In the 4th and 5th revisions, they decreased the recommendation because the quality of dietary protein had improved. In the 6th revision, they substituted the nitrogen balance method for the factorial method. Using this substitution they recommended 75g of dietary protein for adult males and 60g for adult females. The additional recommendation for women during their pregnant-lactating period ranged from 10g to 30g. The most remarkable change was the decrease in protein for lactating women more than the decrease in pregnant women in the 3rd revision.

The calcium recommendation was 500mg for adults in the 1st and 2nd revisions and 600mg for adults in the 1st edition, and 3rd, 4th and 5th revisions. In the 6th revision the factorial method was used as it increased calcium intake to 700mg. The first calcium recommendation for pregnant-lactating women was rather high : 1,300mg for the second half of the pregnancy, 1800mg for the lactating period, and then the recommendation was decreased. In the 5th and 6th revisions, the calcium recommendation was 1,000mg during pregnancy, and 1,100mg for the lactation period.

The iron recommendation was increased in several revisions. In the 6th revision, they recommended 12mg for adult males, 18mg for adult females, 26mg for the first half of the pregnancy, 30mg for the second half of the pregnancy, and 20mg for the lactation period. Vitamin A recommendations changed in two ways, the quantity and the unit. They used IU to the 3rd revision and then they used the RE unit in the subsequent edition. In the 1st edition,

the adult vitamin A recommendation was 5,000 IU to 4,000 IU from β -carotene and 1,000 IU from vitamin A-alcohol-ester. The absorption rate of β -carotene was one third of vitamin A. They, therefore, recommended 2,333 IU of vitamin A. From the 1st to 3rd revisions, a healthy adult was recommended 2,000 IU of vitamin A. In the 4th revision they recommended 750 RE. The Recommended vitamin A intake in the 5th and 6th revision was 700 RE for adults. There was a difference in the vitamin C recommendation between men and women up to the 3rd revision. But in the next edition the recommendation was changed to 55 mg for both adults. The

recommendation for vitamin D was 10 μ g, only to pregnant-lactating women up to the 3rd revision. But from the 4th revision, vitamin D was recommended to all healthy adults.

4) Recommended energy ratio of protein : fat : carbohydrate(P : F : C)

Table 2 shows the changes of the recommended energy ratio of protein : fat : carbohydrate(P : F : C) from the 1st to 6th revision. A fat recommendation was added with caution in the 1st revision. At that time, it was hard to decide how much fat we needed to intake. In the 1960's, Koreans obtained 8% of to-

Table 1. The outlines of RDAs change

Classification		The 1st edition (1962)	The 1st revision (1967)	The 2nd revision (1975)	The 3rd revision (1980)	The 4th revision (1985)	The 5th revision (1989)	The 6th revision (1995)	
Physical Standard	Age	25	25	20 - 49	20 - 29	20 - 24	20 - 29	25	
	Height (cm)	male	166	168	168	170	171	171	172
		female	154	157	157	158	160	160	160
	Weight (kg)	male	58	60	60	60	63	64	66
female		48	52	52	52	52	53	53	
Recommended nutrient		Energy, Protein, Vit A, B ₁ , B ₂ , C, D, Niacin Ca, Fe	Same as left	Same as left	Same as left	Same as left	Same as left	added Vitamin E, B ₆ , folic acid, P, Zn	
Energy (kcal)	male	2,900	3,000	2,700	2,700	2,500	2,500	2,500	
	female	2,200	2,200	2,000	2,000	2,000	2,000	2,000	
Protein (g)	male	70	0	80	80	75	70	75	
	female	65	70	70	70	65	60	60	
Vit A (I.U. or RE)	male	5,000	2,000	2,000	2,000	750	700	700	
	female	5,000	2,000	2,000	2,000	750	700	700	
Vit D (μ g)	male	-	-	-	-	10	5	5	
	female	-	-	-	-	10	5	5	
Vit C (mg)	male	70	70	60	55	55	55	55	
	female	60	60	50	50	55	55	55	
Vit B ₁ (mg)	male	1.3	1.5	1.4	1.1	1.3	1.25	1.2	
	female	1.0	1.3	1.0	1.0	1.0	1.0	1.0	
Vit B ₂ (mg)	male	1.8	1.8	1.6	1.6	1.5	1.5	1.6	
	female	1.6	1.3	1.2	1.2	1.2	1.2	1.2	
Niacin (mg)	male	19	20	18	18	17	16.5	17	
	female	12	15	13	13	13	13	13	
Ca (g)	male	0.6	0.5	0.5	0.6	0.6	0.6	0.7	
	female	0.6	0.5	0.5	0.6	0.6	0.6	0.7	
Fe (mg)	male	10	10	10	10	10	10	12	
	female	12	10	18	18	18	18	18	

tal energy from fat. Since the committee considered this to be too low, they recommended an increase in the fat intake to 12%. When the 2nd revision(1975) was released, Koreans tended to consume large amounts of carbohydrates. Therefore the committee established the energy ratio from protein, fat, and carbohydrate(PFC) at 12%, 12% and 76% respectively. In the 3rd revision(1980), the committee encouraged the intake of fats and oils. In the 4th revision (1985), the committee established a PFC ratio of 15%, 20% and 65% in the 5th revision(1989), the dietary guideline by the Korean Nutrition Society was included in RDA, and energy recommendations from fat were established at 20% of total calories. They suggested a saturated fatty acid and polyunsaturated fatty acid ratio in the range of 1 : 1 to 1 : 2.

The energy ratio of PFC in food composition was 15 : 20 : 65. The recommended fat intake was 20% of total calories with a range of 15–25%. That suggested an increase during adolescence and pregnancy-lactation which had increased the fat requirements, and lowering in the elderly who had an increased morbidity risk via chronic diseases. The intake of PUFA and SFA was recommended as 6% of total energy with a P : M : S ratio of 1 : 1.0–1.5 : 1. The fatty acid ratio between n-6 and n-3 was 4 : 1–10 : 1 with an importance of biological function in vivo of n-3 fatty acid. Fish(mackerel, tuna, salmon, menhaden, herring), perilla oil and soy bean products were recommended as a source of n-3 fatty acid. Particularly the need is for infants, premature babies who are developing nervous systems, and pregnant-lactating women. Cholesterol intake should not exceed 300mg/day for adults who are in danger of coronary artery disease. Na intake was 150mEq/day, same as in the 5th revision(Table 2).

5) Other nutrients

In the 3rd revision(1980), the committee commented on Mg, Zn for future recommendation. In the 4th revision(1985), the committee commented on vitamin E, K, B₆, Folic acid, P, Mg, Zn and Na. Also they recommended limiting the salt intake to

10g/day as NaCl. Vitamin B₁₂ was commented to the 5th revision unlike other revisions. No more than 150mEq/day(as Na 3,459mg, as NaCl 8.7g) of Na should be taken and below 6.4g of salt intake per day was recommended. In the 6th revision, dietary fiber was introduced. The recommended intake was 20–25g/day. Energy from complex carbohydrates was recommended as 60–70%. The recommendation of K was not established due to the

Table 2. Recommended energy ratio of protein : fat : carbohydrates(P : F : C)

The 1st revision (1967)	12 : 12 : 76
The 2nd revision (1975)	12 : 12 : 76
The 3rd revision (1980)	encouraged the intake of fats and oils
The 4th revision (1985)	15 : 20 : 65
The 5th revision (1989)	15 : 20 : 65 emphasis 20% of total calories P : S ratio 1 : 1~1 : 2
The 6th revision (1995)	20% of total calories with a range of 15–25% Intake of PUFA and SFA was recommended as 6% of total energy. P : M : S ratio of 1 : 1.0~1.5 : 1. n-6 : n-3 ratio of 4 : 1~10 : 1. Cholesterol below 300mg

Table 3. The other nutrients commented in RDAs

The 3rd revision (1980)	Mg, Zn
The 4th revision (1985)	Vit E, K, B ₆ , folic acid, P, Mg, Zn and Na 10g/day as NaCl
The 5th revision (1989)	Vit B ₁₂ 150mEq/day (Na 3,459mg, NaCl 8.7g) below 6.4g salt.
The 6th revision (1995)	Dietary fiber 20~25g/day Energy from complex carbohydrates 60~70%. Na intake 150mg/day as in the 5th revision. I, Se, Cu, Mn, F, Cr : optimal range. Pantothenic acid, biotin, taurine, choline, inositol, flavonoids, and carnitine

lack of equilibrium measurement. Recommended intake of I, Se, Cu, Mn, F, Cr for adults was added within an optimal ranges. Pantothenic acid, boitin, taurine, choline, inositol, flavonoids, and carnitine were also introduced(Table 3).

2. Dietary guideline for Koreans

The dietary guidelines were established to improve the diet of the average person. They aimed mainly at preventing chronic degenerative diseases and improving public health. In the 1980s many countries made an effort to release dietary guidelines for the prevention of diseases and improvement of public health. In Korea, after the Ministry of Health and Welfare published their guidelines for public health in 1984, a number of academic societies released detailed dietary guidelines in 1985–1986. The Korean Nutrition Society also released dietary guidelines in 1986, which was the cornerstone for the dietary recommendations provided eating a variety foods. The following is a summary of the dietary guidelines released(Chang et al. 1998 ; Korean Nutrition Society 1986 ; Yoon 1995).

1) Dietary Guideline for Koreans(The Korean Nutrition Society, 1995)

- (1) Eat a variety of foods
- (2) Maintain healthy body weight
- (3) Eat enough proteins
- (4) Have fat intake of 20% of total calories
- (5) Drink milk everyday
- (6) Choose a diet moderate in salt
- (7) Maintain dental care
- (8) Limit alcoholic and caffeine beverages and stop smoking
- (9) Have Balance diet and maintain lifestyle conductive to health
- (10) Enjoy mealtimes

2) Guideline for Public Health Life(Ministry of Health and Welfairs, 1984)

This was the 1st guideline for public health life released by the government. The purpose of these guidelines was to remind us of the importance of sanitation standards and health knowledge.

(1) Maintain personal hygiene : wash hands before eating and brush teeth afterwards

(2) Eat a variety of foods, and choose a diet moderate in salt

(3) Take regular vaccinations and health checkups

(4) Stop smoking and do not drink too much

(5) Exercise regularly and maintain physical vitality

(6) Enjoy working and life

(7) Maintain public discipline and safety precautions

(8) Do not waste resources and maintain a healthy environment

3) Dietary Guideline for Koreans' Health(Academic Council on Food, Nutrition and Economy in Korea, 1985)

(1) Eat a variety of foods

(2) Eat an adequate diet to maintain ideal body weight

(3) Eat beans, seafoods, milk and fruits

(4) Keep diet low in salt

(5) Do not waste food and enjoy mealtimes

4) Guideline for Improving Public Diet(Pan-Korea National Movement Head-Quarter for Dietary Improvement, 1986)

(1) Eat a variety of foods

(2) Choose meats, seafoods, and beans

(3) Take adequate fat from diet

(4) Drink milk

(5) Choose a diet moderate in salt

(6) Use homegrown(i.e. Korean) foods as possible

(7) Enjoy daily meals

5) Guideline for Public Diet(Ministry of Health and Welfairs, December, 1990)

(1) Eat a variety of foods, with a recommended fat intake equaling to or less than 20% of total calories

(2) Maintain ideal body weight and prevent obesity

(3) Eat foods low in salt.(Salt intake should not exceed 10g)

(4) Do not drink too much

(5) Eat regularly and enjoy meals

Different nations have different sets of RDA and

dietary guidelines. In Japan, the energy allowance for males and females in 1994 were 2,500kcal and 2,000kcal and respectively. The allowances for protein intake were 70g(male) and 60g(female). However, the dietary guideline set energy allowances for 1,

600kcal, which equals to 20 points(1 points is 80kcal) (JADA 1994 ; Kagawa 1989). In China, the energy allowance for males and females in 1979 were 2,401kcal and 1,993kcal, respectively. The allowances for protein intake were 65g(male) and 57g(female).













Food group	Amount of one food exchange and energy	Numbers of food exchange			Energy composition
		2,500kcal Men	2,000kcal Women	2,200kcal Standard	
Cereals grains, and starches	 =  = 100kcal rice 70g bread 35g	16	13	14	Carbohydrate 67% Protein 13% Fat 20%
Meat, fish, eggs, and beans	 =  = 50kcal fish 50g meat 40g	4	3	4	
vegetables	 =  = 20kcal spinach 70g cucumber 70g	6	5	5	
Fat, oils and sweets	 =  = 45kcal oil 5g peanut 10g	7	6	6	
Milk and milk-products	 =  = 125kcal fresh milk 200cc dried milk 25g	1	1	1	
Fruits	 =  = 50kcal orange 100g apple 100g	2	1	2	

Fig. 2. Food exchange lists according to energy intake allowance.

Standard basic food groups

Calories 2,200kcal
Carbohydrate 370g
Protein 75g(animal protein 35%)
Fat 50g






Food groups	Number of servings	Serving size
Cereals, grains, and starches	4	
Meat, fish, eggs and beans	4	
Vegetables and fruits	8	
Milk and milk products	1	
Fat, oil and sweets	6	

Fig. 3. Example of a food exchange pattern for 2,200kcal.

However, the dietary guideline shows that the allowances for energy and protein were 2,265kcal and 62g respectively(Qiu Qiughua 1979).

In Korea, the energy allowance for males and females are 2,500kcal and 2,000kcal respectively. The allowance for protein intake are 75g(male) and 60g (female), but no standard dietary guideline for adults exists. Therefore, in this paper, based on the Korean RDA of energy intake, energy intake for dietary guideline is set for 2,250kcal, which is the mean RDA of energy for males and females(Fig. 2). An example of a dietary guideline that uses a food exchange system with a one-day serving size is shown in figure 3. Food exchange systems proved so useful that they are now in general use for diet planning in hospitals, schools, and industries(Fig. 3). Therefore, dietary guidelines using the food exchange pattern by ages or group should be provided in the near future.

3. Food guide

The Food Guide provided the framework for Koreans to balance the type and amount of foods. The food groups and serving sizes were determined, and number of servings were suggested according to age (i.e. adult, adolescent, elderly, pregnant) women to satisfy the RDA requirements. It has been updated since the 1st edition of RDA(Asia Food and Nutrition Institute 1994 ; Kim & Lee 1988).

1) Basic food groups

The classification of food groups in the Food Guide was a modification of the Basic Five Food Groups. Food groups were classified by the table of food composition, the dietary pattern for Koreans, nutrient content of foods, and consideration of specific foods contribution to total nutrient intakes. They were : (1) Cereals, grains, and starches, (2) Meat, fish, eggs and beans, (3) Vegetables and fruits, (4) Milk and milk products, (5) Fats, oils, and sweets. When it offered suggestions for putting the guidelines into practice, it balanced a variety from all food groups over the course of a day and one-week. Since foods in the same groups differed in nutritional content, planning a diet according to the Food Guide could provide a guideline for daily food practice as well as

RDA.

2) Food pagoda

The Food Tower, presenting a pictorial description of the food guide, was released in 1995, the 6th revision of RDA. It also emphasized the importance of a food guide in creating a dietary pattern to increase public understanding. The food tower was designed after a Korean traditional five-storied tower. Each story's breadth and position symbolized the importance and quantity of the food groups. The bottom of the tower consisted of cereal and grain products notable for their complex carbohydrates, which was the staple food of Korea. The second story represented vegetables and fruits which were quantitative foods, the third story represented the animal foods, the fourth story was the milk and milk products for calcium intake. Fat, oils and sweets were placed in the top story.

3) Serving size

The serving size recommended in the Food Guide was the standard serving size for Koreans based on portion size information from the national nutrition survey, several cooking books, nutritional facts, large food service institutes and the American food labels. Serving size was defined as the amount of food supposedly eaten, not the amount of food that should be eaten. Therefore, it was very close to the actual daily intake for Koreans. The serving size for each food group was decided considering dietary habits and serving sizes in the home in order to maintain similar nutritional content for food groups. For example, the serving size of milk or milk products was set as equivalent to the calcium content of a cup of milk. In the cereal and grains group, total calories of a serving of rice was higher than anything in other food groups as applied to Koreans' daily dietary patterns.

4. Impact of the dietary guideline

Until now we have reviewed the history of Korean RDA, dietary guidelines, and food guides. Hereafter, this study will explain how these guides have influenced public health and the dietary and nutritional status of Koreans, which can also be influenced by

Table 4. Causes of death by 19 chapters classification(1981 - 1996) (% of total death)

	1981	1985	1988	1991	1994	1996
Disease of the circulatory system	24.8	31.8	30.0	28.7	29.9	30.4
Neoplasms	10.5	15.1	18.2	19.2	21.3	17.1
External cause of mortality(accidents)	7.5	11.6	13.8	15.7	13.9	13.2
Disease of the digestive system	7.5	9.0	8.4	7.8	7.6	8.6
Disease of the respiratory system	4.2	4.6	4.1	3.9	4.9	4.0

National Statistical Office, Annual report on the cause of death statistics(based on vital registration) 1996

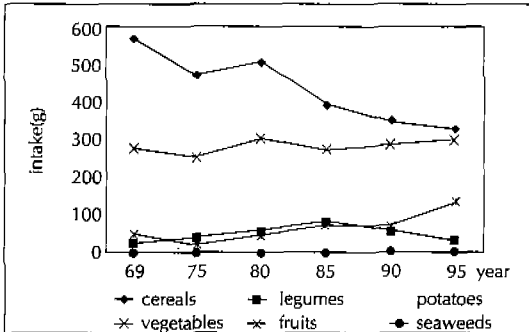


Fig. 4. Yearly change in intakes from the plant food group. (nationwide, per capita per day)

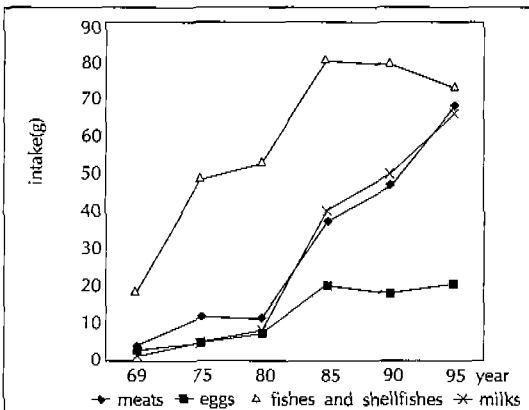


Fig. 5. Yearly change in intake from the animal food group. (nationwide, per capita per day)

other factors such as economy or medical technology.

1) Average life span

The average life span of a Korean has increased during the 25 years(1970-1995) by ten years(67.2 to 73.5). The proportion of the elderly has also increased during the past 35 years(1960-1995) from 2.0% to 6.05%

2) Common cause of death

In the 1960s, infectious diseases involving the digestive and respiratory system were the most common

cause of death. By 19 chapters classification, the most common causes have been replaced by diseases of the circulatory system, neoplasms and external causes of mortality due to the influence of economic development, changes in lifestyle and dietary pattern. This ranking has not changed in the last 15 years (Table 4).

3) Status of food intake

During 1969 to 1995, decreased intakes of grain and potatoes were responsible for the low intake of vegetable foods in spite of increasing intake of fruits. On the other hand, intake of animal foods has increased with the increasing intakes of meat, eggs, fish and shellfish, milk and milk products(Figs. 4, 5).

4) Status of nutrient intake

Intakes of energy and carbohydrate have decreased slowly while intakes of fat and protein have increased significantly. Fat intake from grain and beans decreased although intake from meat, milk, and milk products has increased. Intake of vitamin A and calcium take of recommended levels. Energy from protein has increased with an increasing proportion of animal protein. Energy intakes from protein, fat and carbohydrate were 12.5%, 7.2% and 80.3% in 1969 but 16.1%, 19.1% and 64.8% in 1995(Fig. 6). In the distribution of fat energy, the households which obtained less than 20% were 62.9% and above 20% were 37.1% in 1995(Table 5) (Korean Rural Economic Institute 1996 : Ministry of Health and Welfare 1995 - 1996).

5. Conclusion and suggestions

In 1962, the Korean Recommended Dietary Allowance was introduced with inclusion of food composition, the Five basic food groups, serving size for each food group, and portion size. The practical

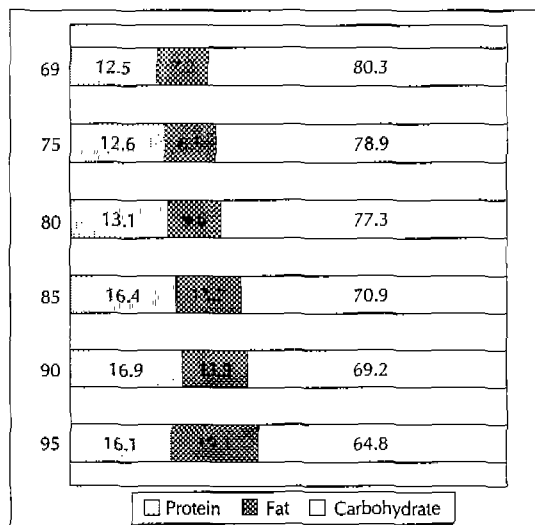


Fig. 6. Yearly change in the energy contribution profile of 3 macronutrients(National Nutrition Survey).

Table 5. Distribution of fat energy as % of total energy intake

Year	less than 10%	less than 20%	20% or more	30% or more
90	14.8	72.6	27.4	5.0
91	21.9	70.6	29.4	5.3
92	12.8	56.8	43.8	12.5
93	15.6	67.0	33.0	5.1
94	14.8	63.3	36.7	5.8
95	15.1	62.9	37.1	6.6

less than 20% : include less than 10%
 20% or more : include above 30%

dietary guidelines were developed in 1984. Despite broad possibilities for application, they had limited use, mainly for nutritional assessment and food preparation. They were not thoroughly utilized in public nutritional education and nutritional policy through the media because of the weakness of the government's food and nutrition policy and lack of administrative and dietitian support in health department and administrative organizations.

In regards to public health and nutrition status, the life expectancy, however, has increased by 10 years since the 70's and the elderly population has been increased threefold in 1995 compared to 1960. The common causes of death in 1996 are first, diseases of the circulatory system ; second, neoplasms ; third, external causes of mortality ; fourth, di-

seases of the digestive system ; and fifth, diseases of the respiratory system by 19 classifications.

In food intake, grain and complex starch intake has decreased while fruit and animal foods have increased markedly. Therefore, energy from carbohydrates has decreased while energy from protein and fat has increased. Energy intakes from protein, fat and carbohydrate were 12.5%, 7.2% and 80.3% in 1969 but 16.1%, 19.1% and 64.8% in 1995. In the distribution of fat energy, the households which obtained less than 20% were 62.9% and above 20% were 37.1% in 1995. Only vitamin A and calcium were below RDA levels.

In the future, the KRDA should include dietary fiber and the proper ratio of essential fatty acids(n=3 vs n=6). Some minerals and vitamins, such as Mg, Na, K, I, Se, Mn, F, Cr, pathotenic acid, and biotin, need to be concerned. It has been suggested that taurine, choline inositol, and carnitine have a good effect on health. Therefore those nutrients need to be considered for inclusion in the KRDA in the future. Finally, nationwide attention should be focused on public nutrition education and public activities with supplementation of the RDA, the food guide, and the dietary guideline.

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