

## Nutrition in the Republic of Korea

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Until the 1970s, the Korean economy was dominantly agriculture, but nowadays, less than 10 % of the population lives in a rural area, and it is expected that within a generation the proportion of the population engaged in agriculture will be less than 5 %. The living standard is rising as the national economy benefits from the increased sale of industrial products. The dietary patterns are being changed. The diet has changed from one based predominantly on starch based food such as cereals or roots and vegetables to one in which animal products take great prominence with consequent increases in animal fat and protein. The move from simple unrefined foods to more refined and complex manufactured foods has become commonplace. As a result, the general nutritional situation has been improved. Such improvement, however, has brought about an increase in overnutrition in more affluent sections of the population, whereas dietary inadequacy among the lower socio-economic groups and vulnerable classes still persists. Overall, Korea suffers from both undernutrition and overnutrition. The national school feeding program started in 1953 after the Korean War with the support of UNICEF, CARE, and USAID as a relief food program and is now expanding successfully to a self-supporting nationwide scale. The applied nutrition project in rural areas introduced in 1967 with the support of UNICEF, FAO, WHO, and the Korean government continues successfully to the present day. A national dietary survey has been carried out once a year since 1969, and once every 3 years from 1998. Korean recommended dietary allowances were established in 1962 and have been revised every 5 years. The government intends to establish national dietary guidelines for health promotion and prevention of chronic degenerative diseases. Nutrition education and research are also very important national undertakings.

### **Nutrition: Dietary allowances: The Republic of Korea: School feeding program**

#### *Background*

In 1946 right after World War II, the population of Korea was a little less than 20 million and over 70 % of the population were engaged in agriculture, so that the Korean economy was dominated by agriculture, and was very weak (Lee *et al.* 1998a). The Korean people suffered from food shortages and nutritional inadequacy until the 1970s. Especially during the Korean War (1950–53) and for a certain period after the war, Koreans faced very serious food shortages. There was a preferential food allocation system for the army ration supply, relief food supply for the war refugees, damaged population by the war, etc. and those situations had much influence on the public food shortage.

From the early 1960s to the end of the 1970s Korea launched and implemented its earliest economic

development plans. From the end of the 1970s to the end of the 1990s, there was a dramatic transition to an industrialized country. The GNP of Korea was US\$ 11380 in 1996, whereas it was US\$ 289 in 1971 (National Statistical Office, 1999a), and the nutritional situation was much improved over this period. Such improvement, however, has brought about a growing increase in the over nourished population and chronic degenerative diseases are becoming more common. At the same time, under-nutrition among low-income groups still persists.

Overall, Korea now suffers from both undernutrition and overnutrition. In the past, it was commonly believed that the nutritional problems could be solved through economic growth and a sufficient supply of food. As illustrated by our nutritional history, economic growth and affluence raise new and unexpected nutritional problems.

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**Abbreviations:** ANP, applied nutrition project; DGL, national dietary guidelines; RDA, recommended dietary allowances.

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### *School feeding program*

The school feeding program (Korean Nutrition Society, 1989a) as a relief food program started in 1953 with the aid of UNICEF, CARE and USAID and the importation of US surplus agricultural products under the program of US PL-480 also contributed greatly to solving the national food shortage. The school feeding program has been successful and from 1973 it changed to a self-supporting system. In 1997 the program covered 88.6 % of the total primary schools (Lee *et al.* 1998b), and will be expanded to middle and high schools in the near future.

### *Applied nutrition project (ANP)*

The ANP has been carried out nationwide in rural areas from 1968 and was supported for the first 20 years by the Korean government, UNICEF, FAO and WHO (Korean Nutrition Society, 1989b). It is still active as a self-supporting system, and the project has greatly contributed to promoting the nutritional situation of the rural population in Korea.

### *Nutrition survey*

The Korean national nutrition survey was carried out once a year from 1969 to 1995 (Ministry of Health and Welfare, Korea, 1969–95), and most of data were based on per person or per adult only. Therefore, one was able to grasp national average nutrition status, but was unable to understand the nutritional situation of several different age groups, especially vulnerable groups such as the young and the elderly. There have been several studies of the nutritional situation of particular populations, including pregnant and lactating women (Kim *et al.* 1994), infant and pre-school children (Lee *et al.* 1998a,b), primary school children (Kim *et al.* 1989), high school children (Lee & Kim 1973), and the elderly (Kang, 1994), but these have involved rather small numbers of subjects.

### *Nutritional situation*

The present situation of dietary and nutritional intake in Korea (Ministry of Health and Welfare, 1995) could be briefly summarized as follows:

The intake per person per day of the staple food (rice) has steadily decreased from 395 g in 1983 to 267 g in 1995, and that of total cereal has also steadily decreased from 559 g in 1969 to 309 g in 1995. Among the cereals, the intake of barley was notable, in that it was 172 g in 1969 and only 4 g in 1995. The intake of vegetables has been relatively stable at around 270 g throughout the past 30 years. The intake of fruit was much increased from 48 g in 1969 to 120 g in 1995.

The intake of animal foods was much increased over the past 30 years; the intake of meat, eggs, milk and fish were 6.6 g, 4.2 g, 3.0 g, and 12.0 g, respectively, in 1969, while the intakes were 67.7 g (10 times), 21.5 g (5 times), 65.6 g (22 times) and 75.1 g (6 times), respectively, in 1995.

As a result of the changes in food intakes such as decreased cereals and vegetables and increased animal

produce, the intake of energy was steadily decreasing due to decreased intake of staplefood, and the constituent ratio of energy intake from carbohydrate, protein and fat was 64.8:16.1:19.1 in 1995, while that was 80.3:12.5:7.2 in 1969.

Nowadays, the average intake of energy is slightly below the Korean recommended dietary allowances (RDA) level, but this apparent shortage may not be a serious problem because some of the affluent groups and others have begun to suffer from obesity. This phenomenon may be due mainly to a change in life-style with reduced energy expenditure through reduced muscular exercise rather than greater intake of energy.

### *Nutritional problems among different age groups*

In general, although nutritional intakes have much improved during the past 30 years, there are still certain nutritional problems in each age group.

Among pregnant and lactating women (Kim *et al.* 1994), nutritional intakes were much improved over the past 30 years, although the intakes of Ca, Fe, vitamin A and B2 are still inadequate. The prevalence of breast-feeding has decreased steadily to about 30 % in rural areas and about 10 % in urban areas in the 1990s compared with over 90 % in rural areas and over 40 % in urban areas in the 1970s (Lee *et al.* 1998a).

The nutritional intakes of infants (Wani, 1997; Lee *et al.* 1998b) who were fully artificially fed or partially breast-fed supplemented with artificial foods were mostly below Korean RDA level except for the intake of vitamins B1 and C. Nowadays, several varieties of weaning foods and complementary foods for infants are available commercially, even if some of them are not of recommendable quality.

The nutritional intakes of pre-school children (Mo *et al.* 1990) are still rather meager in general. The protein intakes of pre-school children in rural areas and in slums in urban areas have remained at about 70–80 % of Fe which is about 1/2 to 2/3 of Korean RDA levels, and the intakes of Ca, vitamin A and B2 are also inadequate.

The school feeding program (Korean Nutrition Society, 1989a) for primary school children has contributed much to promote improved nutrition, and the program has steadily expanded to cover a larger number of subjects. It has introduced the children to the habit of drinking cow's milk and/or soy-milk, and contributed to intakes of better quality proteins, Ca, Fe, vitamin B2, and some other nutrients. The prevalence of obesity among primary school children (Kang *et al.* 1997) in urban area was 15–19 % for boys and 10–15 % for girls in the 1990s compared with only 2–3 % in the 1970s. The nutritional status of pre-school children in urban areas was better than that in the rural areas (Mo *et al.* 1990; Kim *et al.* 1989). The nutritional situations of rural areas were not much improved with nutritional intakes below the levels of the Korean RDA for energy (60–70 % of RDA), protein (70–80 %), Ca (50–70 %) and Fe (40–80 %) and the incidence of anemia was about 12 %. Recently, a new nutritional problem has appeared among school children who dispense with lunch due to economic problems or unemployment of their protector during 1997–1999.

The nutritional status of high school children (Lee & Kim, 1973, Lee *et al.* 1971) in rural areas was worse than that of the primary school children, and the intake levels of Ca, Fe and vitamin A in high school children in the capital city of Seoul were also below Korean RDA levels.

Nutritional surveys of the elderly are very rare. There have been some surveys (Kang, 1994; Kim 1980) of the elderly who stayed in a welfare house or similar, and were in economic poverty. Their nutritional intakes were mostly very poor with energy intakes at about 65 % of the Korean RDA levels, and the intake of Ca, vitamins A and B2 were much lower than Korean RDA levels. Several small-scale free lunch programs have been started for the poor elderly in some urban areas supported by government, religious organizations, private relief organizations or private volunteers. Whilst they were not enough to solve the problems, they are still worth while. About 3.9 % of the total elderly population were being helped in this way, whereas the proportion of elderly needing such help was about 13.4 % in 1993 (Ministry of Health and Welfare, 1993).

Korea needs a new food and nutrition policy in order to secure adequate food and nutrition supply and good national health. To establish a new good foods and nutrition policy, well-prepared recommended dietary allowances, dietary guidelines, nationwide health and nutrition surveys, nutrition education programs and more efforts in nutrition research are essential.

#### *Recommended dietary allowances*

Our first RDA list was published in 1962 and has been revised almost every 5 years. The most recent one, the 6th revision was published in 1995 (Korean Nutrition Society, 1995a) and will be revised next year. The approach to establishing new RDA should be changed to meet our present situation of economy, life-style, food supply, nutrition intake and health and the spectrum of diseases that are foreseen for the future.

#### *Dietary guide line (DGL)*

The recent economic growth in Korea has resulted in the Westernization of dietary choices. As a consequence our main health problems are several neoplasms, cerebrovascular diseases, cardiovascular diseases, accidents, hypertension, diabetes and obesity (Korean Institute for Health and Social Affairs, 1996). On the other hand, malnutrition remains a public health and social problem among poor segments of society. Clearly, the trend is towards a decrease in dietary deficiency diseases and an increase in those associated with dietary excesses.

Several DGLs for Koreans were proposed during the 1980s, the most popular of which was that proposed by the Korean Nutrition Society (Korean Nutrition Society, 1995b) about 15 years ago. However, our general living situation has been much changed since the DGL was introduced, so that the concept of the DGL should be changed. It should be more practical, simple and easily understood. Our government intends to set up in the near future a committee to establish a new DGL for health

promotion, and for preventing some of the typical life-style related diseases.

#### *Nationwide health and nutrition survey*

The Korean Government, Ministry of Health and Welfare carried out national nutrition surveys (Ministry of Health and Welfare, 1969–1995) once a year from 1969 to 1995. The survey has been changed to be done once every three years from 1998, to cover larger number of subjects on an individual basis rather than on a family basis, and to include more items.

#### *Nutrition education*

Nutrition education has been carried out in several levels of schools on a common base on a professional basis. In contrast, there is no organized system for public education on nutrition through the mass-communication system that provides inappropriate information only on rare occasions.

#### *Nutrition research*

Nutrition research of every level, from basic to applied, and involving both healthy subjects and clinical patients, poor to rich, young to elderly are absolutely necessary, but these research activities are rather meager compared with those in other fields of science.

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