Chinese Nutrition Status and Development of Its Nutrition Industry

Under the leadership of the Chinese Ministry of Health, the Ministry of Science and Technology, and the National Bureau of Statistics, an investigation of the nutrition and health status of residents throughout China (covering 31 provinces, autonomous regions, and municipalities; excluding Hong Kong, the Macao Special Administrative Region, and Taiwan Province) was carried out by related departments in each administrative region from August to December 2010. This most recent comprehensive investigation of nutrition and health in China found there has been significant changes in the diet and nutritional status of Chinese residents in both urban and rural areas over the past eight years (2002–2010). However, although the prevalence of malnutrition and nutritional deficiencies has decreased gradually, China is still confronting the challenge of both nutritional deficiencies and nutrient imbalances.

Current Status of Chinese Nutrition and Health

The investigation found that the diet quality of residents in China has been greatly enhanced, and the basic energy and protein requirements of Chinese residents in both urban and rural areas are being met. The consumption of animal-based foods such as meat, poultry, and eggs has increased, and the percentage of high-quality protein consumed is increasing. The average consumption of animal-based foods by residents in urban and rural areas increased from 248 and 126 g/day in 2002 to 286 and 181 g/day in 2010, respectively. Of the total protein consumed, the percentage of high-quality protein rose from 31 to 45%. The percentage of total energy from fat returned to 31%, which is just over the upper limit of 30% recommended by WHO. The percentage of total energy from grain foods increased to 55%, reaching the lower end of the recommended range of 55–65%. Intakes of dairy and bean products were not found to be a general problem throughout China (1).

The extent of growth and development for children and adolescents has been enhanced as well. The average weight of infants at birth reached 4,100 g in 2010. The rate of low weight in infants at birth was only 3.1%, which matches the levels found in developed countries. The average height of each age group from 3 to 18 years old increased by 6.6 cm compared with height measured in 2002; however, the average height of rural males and females was 6.9 and 6.3 cm lower than that of urban males and females, respectively (1).

The prevalence of malnutrition in children has also decreased significantly. The rate of growth retardation in children under the age of 5 years was 8.6%, which is 45% lower than that found in 2002; there was an 84% decrease in urban areas and 63% decrease in rural areas in 2010. The rate of low weight in children was 5.8%, which is 45% lower than that found in 2002; there was a 60% decrease in urban areas and 41% decrease in rural areas in 2010 (1).

Finally, the prevalence of anemia in residents has decreased. Anemia in urban males decreased from 10.6% in 2002 to 8.4% in 2010 and in urban females decreased from 17.0% in 2002 to 11.2% in 2010. Anemia in rural males decreased from 12.9% in 2002 to 9.8% in 2010 and in rural females decreased from 18.8% in 2002 to 16.7% in 2010 (1).

Challenges for Chinese Residents

Despite overall improvements in diet and health, the structure of the diet of urban residents still does not meet recommendations. The consumption of meat and fat is too high, while the consumption of grain foods is too low. The average fat intake per day for urban residents decreased from 44 g in 2002 to 41 g in 2010. However, the percentage of total energy from fat returned to 31%, which is just over the upper limit of 30% recommended by WHO. The percentage of total energy from grain foods increased to 55%, reaching the lower end of the recommended range of 55–65%. Intakes of dairy and bean products were not found to be a general problem throughout China (1).

Only low levels of illness caused by nutrient deficiencies were found throughout China, and malnutrition in children in rural areas has been gradually reduced. The rate of growth retardation and low body weight in children younger than 5 years was 8.6 and 6.3%, respectively. Micronutrient deficiencies such as iron and vitamin A are not a general problem throughout China. The prevalence of anemia in Chinese residents was ≈10.2% in 2010. The average calcium intake of residents throughout China has reached 668 mg, which is 70% of the recommended intake (1).

Even with improvements in overall nutrition, the prevalence of chronic noninfectious illnesses has increased rapidly. The prevalence of hypertension has increased greatly to ≈22.4% in residents over the age of 18 years throughout China. It is estimated that the number of hypertension patients in China could be higher than 191 million. Compared with 2002, the prevalence of hypertension has increased 3.6%, and the number of patients has increased by 31 million. There was no obvious difference between the prevalence of hypertension in urban and rural areas (1).

The prevalence of diabetes has also increased rapidly in residents over the age of 18 years throughout China to ≈4.8%. Impaired fasting glucose (IFG) rate was ≈3.7%. It is estimated that there are ≈65 million diabetes patients in China and another 50 million IFG patients. The prevalence in urban areas is significantly higher than in rural areas (1).
At the same time, there is an obvious increasing trend in the incidence of overweight and obesity patients in China. In 2010 the rate of overweight adults in China was ≈31.6%, and the obesity rate was ≈9.3%. The estimated numbers of overweight and obesity patients were 430 and 126 million, respectively. The overweight and obesity rates for adults in urban areas were as high as 41.5 and 15.8%, while the obesity rate for children rose to 9.3%. It is expected that the obesity rate will continue to increase greatly in the near future due to the large number of overweight patients (1).

Finally, the prevalence of blood lipid abnormalities in Chinese adults was ≈24.1% in 2010. The prevalence of various types of blood lipid abnormalities was 3.7% for hypercholesterolemia, 17.7% for hypertriglyceridemia, and 8.6% for hypo-HDL cholesterol. There was no notable difference in blood lipid abnormality rates between urban and rural residents (1).

**Current Status of the Chinese Nutrition Industry**

Nutrition industry products encompass nutritional supplements, functional foods, natural and organic foods, and natural personal care products (2) (Fig. 1). There are five distinct aspects of the nutrition industry in China: education services, requirement and certification services, special equipment manufacturing, nutritional resources development, nutritional products manufacturing, and nutritional technology development. Five organizations oversee nutrition education and requirement and certification services. Among these services, the greatest need is for a nutritionist training agency. Special equipment manufacturing has three components. The greatest demand is for inspection equipment because there have been so many food safety incidents in China in recent years. Nutritional resources development is related to the basics or fundamentals of the nutrition industry. Nutritional products manufacturing covers five categories: nutrient-rich foods, healthy and functional foods, nutrient-fortified foods, nutritional supplements, and nutrients. The nutrient-rich foods manufacturing category also contains foods such as dairy and soybean products. Finally, nutritional technology development can be divided into three groups: food processing technologies, chemical technologies, and biotechnologies. Among these, biotechnologies are expanding most rapidly because of the funding that has been invested in biotechnologies in China.

**Positive Aspects of the Chinese Nutrition Industry**

According to the Development Report of the Chinese Nutrition Industry, the industry is expanding and growing more organized with the formation of a special functional products group, the development of specialized technologies, an expanding industry and sales network, and a larger role in stimulating related industries.

**Special Functional Products.** There are currently 3,000 types of nutritional products in China, including nutrients, nutrient-fortified foods and products (selenium-enriched teas and iodine-enriched eggs), and nutritional supplements, that use biotechnology for breeding and ecological soil cultivation. These types of products differ from traditional food, medical, and chemical products with respect to their role in improving the nutritional status of consumers (3).

**Specialized Technologies.** Development of specialized technologies for the manufacture of nutritional products is an important area. It is estimated that there are hundreds of special R&D organizations working on nutritional products and thousands of workers engaged in nutritional product R&D. In addition, there are R&D departments for nutritional products and formulas in medical universities and colleges, agencies for disease prevention and control, and agricultural systems (3).

**Industry and Sales Network.** Nutritional products have become a product group that has a large-scale output. In 2001, only nutritional product sales reached 11 billion yuan RMB in China. Some nutritional product manufacturing enterprises have already developed into large-scale industries and are working toward collectivization. Meanwhile, there are sales networks for nutritional products that cover the entire country. Nutritional product shops are being set up in department stores, and some franchise stores for nutritional products have been opened in more remote areas (3).

**Stimulation of Related Industries.** Business relationships established between the nutrition industry and its suppliers and distributors are stimulating new developments in specialized equipment manufacturing, inspection equipment manufacturing, packing and logistics, and related service systems (3).

**Negative Aspects of the Chinese Nutrition Industry**

Although there have been many positive advances in the position of the Chinese nutrition industry, it is still negatively affected by several weaknesses.

**Lack of Specialized Administration.** The Chinese nutrition industry is developing quickly but currently has “nowhere to belong.” This has resulted in two types of consequences that endanger consumer safety. Due to the lack of scientific and industry-oriented uniform design and administration, products and markets are not standardized or well regulated. Products have been developed according to existing legislation, but a lack of regulations specifically designed for these types of products has re-

![Fig. 1. Classification of Chinese nutrition industry.](image-url)
duced “nutrition” to a new sales point or a promotional concept to be “hyped.” The other issue is the lack of specialized administration for the industry. As an example, the lack of regulations for safe additive levels led to an incident of tripolycynamide contamination in 2008 (3).

Lack of Separate Administration. Administration of the nutrition industry as a whole does not exist. Administration functions are currently distributed within each related traditional industry connected to the nutrition industry, such as the food, agricultural, pharmaceutical, and chemical industries. Meanwhile, administration of these traditional industries has not been adapted to the requirements of the nutrition industry and, thus, has not solved the new problems introduced by the development of the nutrition industry. These problems include the lack of 1) a comprehensive industry-wide plan and strong macroscopic support and regulating measures; 2) a target-oriented industry policy with induction of technical development, investment direction, industry organization, and exports; 3) related legislation, regulations, and sales market; and 4) criteria for product standards, quality inspections, health quarantines, nutritional formulas, packaging and storage, and dissemination of information in accordance with production and circulation regulations (3).

International Presence. The R&D and production strength of the Chinese nutrition industry has a considerable presence in southern and central Asia. Several products, such as EDTA, sodium, iron, and ionic mineral concentrates, have a global presence. However, current industry integration is far from reaching expectations, which reduces the overall presence of the Chinese nutrition industry globally (3).

Limited Connection to International Markets. The scale of nutritional products imported into the Chinese market is increasing gradually. Because the Chinese nutrition industry currently is distributed through related traditional industries, it is difficult for the nutrition industry to be fully connected to international markets with regard to market data, information exchange, and international comparisons. It also puts the Chinese industry at a disadvantage with regard to the trend toward internationalization of the nutrition industry (3).

Development Plan for the Chinese Nutrition Industry Demonstration Base

Beijing was chosen as the location for the headquarters of the Chinese Nutrition Industry Demonstration Base (CNIDB) because it offers advantages for stimulating the industrialization, globalization, and technical development of Chinese nutritional products. As the administration center of the Chinese government, Beijing is also the hub for political, economic, scientific, and cultural exchanges between China and other countries (4). As the first national base for the Chinese high-tech industry, Zhongguan Village achieved rapid development and successfully implemented an operation plan. Based on this success, the plan and construction of CNIDB will borrow from the experience of Zhongguan Village (4).

In 2001, the Center of Public Nutrition and Development was founded with the support of the National Developing and Reforming Commission, which was engaged in studying, planning, following, and directing the Chinese nutrition industry. Related UN organizations, as well as other international organizations, have also facilitated and supported the development of the Chinese nutrition industry and construction of CNIDB (4). The overall objectives of the CNIDB construction were to establish the CNIDB with an initial investment of 16.9 billion yuan RMB. The CNIDB will have 790 acres and construction will have two phases from 2002 to 2012 and from 2012 to 2022. The first generation of construction will be in Beijing; second generation of construction will radiate out from Beijing to eastern, southern, northeastern, northwestern, and southwestern China. Four or five nutrition bases will be set up at Shanghai, Guangdong, Liaoning, Shanxi, and Sichuan.

Nutritional Products Manufacturing. Nutritional products manufacturing is the foundation of the CNIDB. International standards will be used to build a factory and facilities that will attract advanced high-tech enterprises engaged in nutritional product manufacturing. Meanwhile, sufficient land will be preliminarily developed and reserved for CNIDB enterprises to build self-designed factories (4).

Nutrition Science and R&D. Headquartered at the Institute for Nutrition and Food Safety of the Chinese Center for Disease Control and Prevention, the CNIDB will attract the participation of prominent international nutrition science and R&D organizations. Meanwhile, Chinese societies and organizations and international organizations and units engaged in scientific research on nutritional products will be invited to CNIDB. The main purpose of nutrition science and R&D is to follow, study, and develop technologies for international and Chinese domestic nutritional products (4).

Nutrition Education and Training. Chinese nutrition universities or colleges with a full international component will be founded within the CNIDB to foster advanced nutrition expertise. Meanwhile, a nutrition training center will be founded within the CNIDB, and education or training for different target groups will be offered in short-term classes or weekend classes for the public. Periodic lectures on nutrition will be developed, and specialists who can popularize nutrition information will be invited. Versatile types of mass communication will be used to disseminate information through the media and within the CNIDB (4).

Nutrition Services. The first subdistrict community on nutrition in China will be developed within the CNIDB, which will be followed by development of a detailed procedure for monitoring the nutritional conditions of residents in such a subdistrict. A multifunctional subdistrict integrated with purchasing, education, sports, leisure, restaurant dining, and medical care also will be established. Monitoring of the health of subdistrict residents will be conducted to measure trends in Chinese resident nutrition development and supply vital reference data for enhancing the overall health of Chinese residents (4).

Nutritional Culture. A park based on nutrition will be founded within the CNIDB and will project the image of the CNIDB to build the atmosphere of a nutritional culture, increase public awareness of a nutritional culture, and convey the meaning of nutritional culture. The park will also enrich the touring resources of Beijing (4).

Nutrition Logistics. A Chinese nutrition museum will be founded within the CNIDB that will act as a platform for nutritional product exchanges, demonstrations, and information exchanges. The electronic resources of the nutrition industry will be realized using Internet information techniques, which will reduce the costs of logistics and increase efficiency. This sector will focus on storage and transportation, logistics services, and supply chain optimization (4).

Nutrition Industry Administration and Services. The feasibility of comprehensive administration of the nutrition industry will be explored in this sector. Related function departments will interact to standardize regulations for production, hygiene, quality, and market administration of nutritional products and to explore new ways of coordinating administration between departments and regions and, thus, create a better macroscopic environment for nutrition industry development (4).
The CNIDB offers a comprehensive strategy to increase public awareness of the importance of nutrition and promote research. It will also aid in standardizing and regulating the Chinese nutrition industry and markets.

References

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