

NUTRITION IN ASIA

Innovative solutions to nutritional issues in Asia

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Asian countries are big, medium and small in size, and comprise industrialised and developing countries.¹ Some are in transitional states, reflected in their types of nutritional problems. Industrialised countries are more prone to overnutrition and related diseases, such as obesity, high blood pressure, coronary heart disease, cancer, etc., whereas the majority of nutritional problems in developing countries are malnutrition, such as protein energy malnutrition (PEM), and micronutrient deficiencies especially iron deficiency anaemia, and iodine and vitamin A deficiencies.¹⁻⁴ Furthermore, vitamin B₁, B₂, B₆, and folic acid deficiencies cannot be discounted.^{1,5-10} Some transitional countries are also facing increasing rates of overweight and obesity, which can lead to degenerative diseases such as diabetes mellitus, hypertension, coronary heart disease and some types of cancer.^{11,12}

Food-borne parasitic infections, some of which are very dangerous, are also important problems affecting health, such as liver fluke infection (*Opisthorchis viverrini*), which can associate with some carcinogens, e.g. N-nitroso compounds, and cause cholangiocarcinoma (cancer of the bile canals).^{13,14} Food-borne diseases caused by bacteria and viruses are also of public health importance, especially diarrhoea. Chemical toxins, such as aflatoxins caused by mould growth (*Aspergillus flavus*), are also prevalent in the tropics, since the temperature and humidity are suitable for mould growth in agricultural products that are inappropriately stored after harvest, especially peanuts and corn. 8,9-epoxide, the metabolite product

of aflatoxin B₁, is the ultimate carcinogen, which can cause liver cancer.¹⁵ The other common carcinogens are exogenous nitrosamines formed in cured meats, and/or endogenous nitrosamines, which can be formed in the stomach and small intestine.¹⁶ These various factors highlight the very important issue of food safety, not only at the household level, but also at national and international levels, which can affect food exports. Food contaminant limits should meet international standards, e.g. the World Trade Organization (WTO), CODEX Alimentarius. Diarrhoea caused by unsafe foods can retard the growth of children, especially infants and preschool children, and result in wasting and stunting conditions.¹⁷

There are many other reasons for malnutrition, the majority of which are poverty, production and distribution of foods, lack of nutritional knowledge, and ignorance. Many means of nutrition intervention can be utilised, which should be appropriate and applicable to the place and size of the problem(s).^{1,18} Successful pilot projects have been implemented nationwide; however, national implementation programmes cannot succeed without the advocacy of policymakers, politicians, academia, communities, and the general population. Many projects should start from grassroots level, signifying genuine popular participation, and the utilisation of local resources and traditional knowledge should be emphasised. In addition, modern technologies should be transferred to communities. International organisations are beneficial aids to enlarging functional outcomes.¹⁹ With globalisation,

information technology is an essential tool for reaching broad segments of the population so that nutrition education can be distributed via distance learning, even reaching people in remote areas. The most important innovative solution is to promote nutrition programmes as national programmes in accord with other national programmes aimed at creating a healthy population, which implies physical, mental, social, and spiritual health.²⁰

1. World Health Organization. <http://www.who.org> (accessed April 2005).
2. Nutrition Division, Department of Health, Ministry of Public Health. Nutritional status of Thai people, July 2004.
3. Rajatanavin R, Chailurkit L, Winichakoon P, et al. Endemic cretinism in Thailand: a multidisciplinary survey. *Eur J Endocrinol* 1997; **137**: 349-355.
4. Food and Nutrition Research Institute, Department of Science and Technology, Metro Manila, Philippines. Nutrition statistics. <http://www.fnri.dost.gov.ph> (accessed May 2005).
5. Changbumrung S, Poshakrishana P, Vudhivai N, Hongtong K, Pongpaew P, Migasena P. Measurement of vitamins B₁, B₂, B₆ status in children and their mothers in a well baby clinic in Bangkok. *Int J Vitam Nutr Res* 1984; **54**: 149-159.
6. Changbumrung S, Schelp FP, Hongtong K, Buavatana T, Supawan V, Migasena P. Pyridoxine status in preschool children in northeast Thailand: a community survey. *Am J Clin Nutr* 1985; **41**: 770-775.
7. Vudhivai N, Changbumrung S, Schelp FP, Vorasanta S, Prayurahong B, Migasena P. Riboflavin status in preschool children in northeast Thailand: A community survey. *J Med Assoc Thai* 1986; **69**: 543-548.
8. Changbumrung S, Pongpaew P, Schelp FP, Tawprasert S, Egoramaiphol S, Migasena P. Thiamin status in preschool children: A community survey in northeast Thailand. *J Nutr Assoc Thailand* 1987; **21**: 91-101.
9. Songchitsomboon S, Komindr S, Kulapongse S, Puchaiwatananon O, Udomsubpayakul U. Thiamin and riboflavin status of medical inpatients. *J Med Assoc Thai* 1998; **81**: 931-937.
10. Pongpaew P, Saowakontha S, Schelp FP, et al. Vitamin B₁, B₂ and B₆ of rural and urban women in northeast Thailand during the course of pregnancy. *Int J Vitam Nutr Res* 1995; **65**: 11-16.
11. Tungtrongchitr R, Pongpaew P, Tongboonchoo C, et al. Serum homocysteine, B₁₂ and folic acid concentration in Thai overweight and obese subjects. *Int J Vitam Nutr Res* 2003; **73**: 8-14.
12. Harnroongroj T, Jintaridhi P, Vudhivai N, et al. B vitamins, vitamin C and hematological measurements in overweight and obese Thais in Bangkok. *J Med Assoc Thai* 2002; **85**: 17-25.
13. Pungpak P, Chalermut K, Harinasuta T, et al. *Opisthorchis viverrini* infection in Thailand: symptoms and signs of infection – a population-based study. *Trans R Soc Trop Med Hyg* 1994; **88**: 561-564.
14. Changbumrung S, Tungtrongchitr R, Hongtong K, et al. Food patterns and habits of people in an endemic area of liver fluke infection. *J Nutr Assoc Thailand* 1989; **23**: 133-146.
15. Changbumrung S, Thesasilpa J, Harnroongroj T, et al. Aflatoxins M₁ and M₂ in human milk. *J Nutr Assoc Thailand* 2003; **38**: 15-26.
16. Srisalaung T, Boriboon P. Nitrosamine in meat product. *J Nutr Assoc Thailand* 1988; **22**: 164-168.
17. Patwari AK. Diarrhoea and malnutrition interaction. *Indian J Pediatr* 1999; **66**: Suppl: S124-S134.
18. Saowakontha S, Sanchaisuriya P, Pongpaew P, et al. Compliance of population groups of iodine fortification in an endemic area of goiter in northeast Thailand. *J Med Assoc Thai* 1994; **77**: 449-454.
19. Food and Agriculture Organization. <http://www.fao.org> (accessed May 2005).
20. National Strategy 'Building healthy conditions for all Thai citizens', phase I: 2004-2005, phase II: 2005-2009, phase III: 2009-2015.