Beyond the ‘Big Five’: Micronutrients of Emerging Interest for Public Health and Strategic Considerations

Biography

Mr. Geoffry Smith is President of ILSI Southeast Asia Region based in Singapore, and a Member of the Executive Committee of the global ILSI Board. In addition, he is the Chairman of the Essential Micronutrients Foundation, a non-profit organization which addresses micronutrient deficiencies globally as a public health issue. He is also Director of Nutrition Strategies International which deals with food and nutrition issues in developing countries. In addition, he serves as a Member of the editorial board of the journal, Food and Nutrition Bulletin. Prior to his current positions, Mr. Smith was the Global Director, Health Chelates for Akzo Nobel Functional Chemicals, and directed the global business for these compounds in food and nutrition as well as pharmaceutical applications. He was responsible for the global project within Akzo Nobel addressing iron deficiency anemia. In addition, Mr. Smith directed the Asia Pacific activities for Akzo Nobel's Innovation Unit. He is a thirty-year veteran of the chemical industry in the Asia Pacific and has resided in Singapore for more than 20 years. He is a Member of the Nutrition Society of the UK, the American Society of Nutrition and the American Chemical Society.

Abstract

It has been more than 100 years since the “discovery” of vitamins, and since then, the development of the science showing the vital importance to human health of these vitamins and certain minerals in small amounts has expanded greatly. To address deficiencies of these micronutrients, various public health actions have been taken, including not only food fortification but also dietary diversification, supplementation, and more recently biofortification. These approaches have been implemented, often in conjunction, in many parts of the world to reduce or prevent deficiencies, with important success. The key nutrients that have received the most attention have been iodine, iron, zinc, vitamin A and more recently folic acid. The older scourges of deficiencies which cause clear disease or death, like scurvy (from extreme vitamin C deficiency) or beriberi (from thiamin deficiency), have been mostly eliminated (although thiamin deficiency has been widely found in Southeast Asia, and infantile beriberi has been diagnosed, along with outbreaks in Kiribati).

There are more than 25 vitamins and minerals considered essential to human health, and some of these have received less attention in public health, often due to the lack acute disease symptoms. Some are starting to get more attention. Vitamin B₁₂ deficiency, which is associated with increased risk of adverse pregnancy outcomes, impaired cognitive development, and health of the elderly has been called “a major public health problem worldwide”, but there is little data on status and intakes in Southeast Asia. Choline is an essential nutrient, vital in epigenetic
regulation of gene expression. Choline deficiency has been associated with increased risk of neural tube defects in offspring, but again, intakes and status in Southeast Asia are not measured or even estimated.

Recent studies have shown widespread vitamin D deficiency in most Southeast Asian countries, despite regular sunshine. Since vitamin D is critical for bone health and formation, it may be appropriate for action to be taken to address the deficiencies. Questions remain about calcium intakes and the efficiency of its incorporation into bone formation of Southeast (SE) Asian populations. The science of these issues will be reviewed in a SE Asian context.

Additionally, there have been scientific developments on vitamin K, and more particularly vitamin K₂ (menaquinones). At present, for countries that have a vitamin K dietary recommendation, all are based on vitamin K₁ (phylloquinone) intakes and requirements for coagulation. Originally discovered for this function as a factor in blood coagulation, more recent science has shown roles in bone health, vascular integrity, energy metabolism and brain function. Green leafy vegetables are generally a major source of phylloquinones.

References

1 Ian Darnton-Hill, Public Health Aspects in the Prevention and Control of Vitamin Deficiencies, Curr Dev Nutr. 2019 Jun 21;3(9)
