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Food fortification to alleviate micronutrient deficiencies

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Abstract

Key presentations of severe under-nutrition caused by macronutrient deficiencies are marasmus (stunting [insufficient height gain relative to age, long-term malnutrition and poor health], (b) wasting [insufficient weight gain relative to height, recent history of losing weight/acute malnutrition], and (c) underweight [insufficient weight gain relative to age or losing weight; combinations of stunting and wasting]), and kwashiorkor (severe protein malnutrition). Whereas, numerous nutritional disorders exist secondary to different micronutrient insufficiency. It is cost-prohibitive to correct these individual deficiencies. However, food fortification is a practical and affordable solution to this problem. The cost of adding vitamins and minerals to commonly consumed foods is very low. The costs of the ingredients for fortification are estimated to range between 0.5% and 2.0% of the cost of a typical stable food. For formulations that include vitamin A and D, iron, zinc and folic acid, the cost is approximately US $8.0 per metric ton. If one assumes that an individual consumes 100 grams/day (37 kg/year) of the final product, the cost of fortification is approximately US $0.35 per person/year, a cost affordable to industry and consumers. For more complex formulations, such as the World food program (WFP) CSB Plus (Corn soy blend), the cost increases to US $1.0 per person per year. The WFP calculates a minimum normal "food basket" cost of approximately US $0.25 per person/day, or US $92 per year. Thus, the cost of adding micronutrients is less than 0.5% of the food in the basic food basket (or at the higher end, approximately 1% of additional cost). Nevertheless, the outcomes for alleviating micronutrient deficiencies are exceptional, especially for the poor lives in developing countries. For the Malawi school feeding program run by WFP, the average cost was US $22 per child/year; the program provided 100 grams/day of the CSB Plus with all vitamins and minerals, and 11.5 kg a month of maize for the girls. In addition to producing large quantities of healthy food and assuring the availability and affordability of such, the food industry should constantly develop healthful, nutritious food using innovative technologies and market the products to consumers at affordable prices. Additional cost-effective approaches will be discussed. These cost-effective and practical micronutrient food-fortification programs should be designed to add micronutrients to staple diets such as flour or parboiled rice in individual developing country.

Biography

Sunil Wimalawansa, MD, Ph.D., MBA is a Professor of Medicine, Endocrinology, Metabolism, and Nutrition, former chief at the UMDNJ-RWJMS, Professor of Physiology and Integrative Biology, and Director, Regional Osteoporosis center, New Jersey. He has published over 200 scientific articles and 45 scientific book chapters, and 8 books. He has received several awards, including Clinical Excellence in Metabolic Bone Diseases, multiple young-investigator scientific awards, Glen Foundation Endocrinology/Aging awards; Dr. Oscar Gluck Humanitarian award and a prestigious Lifetime Achievement award for his worldwide contributions to science, philanthropic work, and humanity. He is the founder-president of several charitable organizations, worldwide.

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