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Commentary

Implications and Consequences of Micronutrient Deficiency in Food Enhancement Initiatives

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DESCRIPTION

Food fortification is the practice of adding essential micronutrients, such as vitamins and minerals, to food products in order to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health. Food fortification is one of the most cost-effective and sustainable strategies to combat micronutrient deficiencies, which affect more than two billion people worldwide and contribute to various health problems, such as anemia, blindness, impaired immunity, and cognitive impairment. Industrial fortification is the process of adding micronutrients to food products during processing or manufacturing, such as fortifying wheat flour with iron, folic acid, and zinc, or fortifying edible oil with vitamin A and D. Industrial fortification is usually mandated by the government and requires quality control and monitoring to ensure compliance and safety. Bio-fortification is the process of increasing the micronutrient content of crops through conventional breeding or genetic engineering, such as developing rice varieties with higher levels of beta-carotene (pro-vitamin A) or iron. Bio-fortification can benefit rural populations who depend on staple crops for their diet and have limited access to fortified foods or supplements.

Food-to-food fortification is the process of adding micronutrient-rich foods or ingredients to other foods during preparation or cooking, such as adding moringa leaves to soups or sauces, or adding fish powder to porridge. Food-to-food fortification can be done at the household or community level and can enhance the diversity and acceptability of the diet. Food fortification has been implemented in many countries around the world, with varying degrees of success and impact. The food vehicle should be widely consumed by the target population, stable during storage and processing, and compatible with the added micronutrients. For example, salt is a good vehicle for iodine, but not for iron, as iron can cause discoloration and oxidation of salt. The micronutrient should be relevant to the nutritional needs and deficiencies of the target population, bioavailable in the food matrix, and stable during storage and processing. For example, vitamin A is more bioavailable in oil than in flour, and folic acid is more stable than vitamin B12 in flour. The level of fortification should be based on the dietary intake and gap of the target population, the recommended nutrient intake, and the safety margin. The level of fortification should also consider the potential interactions and synergies between different micronutrients. For example, iron and zinc can compete for absorption, while vitamin C can enhance iron absorption. The coverage and compliance of food fortification depend on the availability, accessibility, affordability, and acceptability of the fortified foods. The coverage and compliance can be influenced by the market penetration, distribution, promotion, and regulation of the fortified foods. The coverage and compliance can also be affected by the consumer awareness, knowledge, attitudes, and preferences regarding food fortification. The monitoring and evaluation of food fortification are essential to assess the quality, safety, and impact of the intervention.

CONCLUSION

The monitoring and evaluation can include the assessment of the fortification process, the quality and compliance of the fortified foods, the micronutrient status and intake of the target population, and the health outcomes and cost-effectiveness of the intervention. Food fortification is an important strategy to improve the nutrition and health of populations, especially in low- and middle-income countries where micronutrient deficiencies are prevalent and food systems are undergoing rapid changes. However, food fortification should be complemented by other interventions, such as dietary diversification, supplementation, and behaviour change communication, to address the multiple causes and consequences of malnutrition. Food fortification also requires a multi-sectoral and collaborative approach, involving the government, the food industry, the civil society, the academia, and the consumers, to ensure its sustainability and scalability.

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