



PREVENTING NEURAL TUBE DEFECTS IN ETHIOPIA: LARGE-SCALE MANDATORY FOOD FORTIFICATION URGENTLY NEEDED

POLICY BRIEF

INTRODUCTION

Ethiopia is one of the countries with the greatest burden of micronutrient deficiencies. The level of stunting, underweight and wasting is still unacceptably high, and results in a wide range of effects on vulnerable populations and future generations. Malnutrition, particularly anaemia and stunting, is a significant public health problem in the country,¹ contributing to increased morbidity and mortality, poor learning and productivity at work, and affecting the country's economic development. Ethiopia faces a particularly high level of folate deficiency and folate insufficiency among women,² which contributes to high rates of anaemia and can significantly increase the risk of neural tube defects (NTDs), neonatal mortality and under-5 mortality. The cost of undernutrition on education, productivity

and health is estimated to be 16.5% of Ethiopia's Gross Domestic Product (GDP). Recognizing this, the Government of Ethiopia has endorsed and implemented a number of high-impact nutrition interventions to improve the nutritional status of the population, especially the most vulnerable. However, mandatory fortification of cereals and oil is yet to be legislated in Ethiopia. Fortifying commonly-eaten grains such as wheat, maize flour and rice is among the most high-impact and low-cost interventions to prevent disease, strengthen immune systems, reduce mortality, and nurture a healthy and productive society. Fortifying grains with iron and folic acid is an effective way to prevent anaemia and NTDs in a population. Food fortification will help the country deliver on the Sustainable Development Goals (SDG), particularly SDG 3 (Good Health and Wellbeing).

Nutrition International leads and supports grain fortification efforts in low and middle-income countries through a number of programs.

FOLATE AND NEURAL TUBE DEFECTS

NTDs are made up of a group of severe birth defects resulting from developmental malformation of the central nervous system. The most common NTD cases are Anencephaly and Spina bifida, which typically occur due to loss of integrity of the brain and spinal cord tissues; resulting in stillbirths, child deaths, or lifelong disability.^{3,4} A variety of factors (including genetics and environmental) are involved in the development of NTDs.⁵ However, insufficient folate intake is by far the largest contributor to NTD occurrence world-wide.⁶

Folate plays a key role in the closure of the neural tube (tissues and bone surrounding the spine and brain.) When folate concentration is below the optimal level recommended during early pregnancy (in the first 28 days post-conception), the neural tube is at risk of not closing, resulting in exposure or malformation of the spinal cord or the brain.

THE BURDEN OF NEURAL TUBE DEFECTS IN ETHIOPIA

The most recent hospital-based studies in Tigray and Addis Ababa show very high incidence rate of NTDs in Ethiopia. The overall occurrence of NTDs was 13.1 per 1,000 births in Tigray (disaggregated by zone: 16.6 in Mekelle, 30.4 in Southern Tigray, 89 in Central Tigray, 13.2 in Eastern Tigray, 7.28 in Western Tigray, and 6.98 in Northwest Tigray).⁷ The rate is 10 times higher than the report from eight World Health Organization (WHO) member nations in Africa, (1.0 to 2.0 per 1,000 live births) and 26 times what it should be. Folate deficiency and insufficiency are widespread, prevalent and a public health problem in Ethiopia. A recent assessment based on the most current national micronutrient survey has found that, 84% of women of reproductive age (WRA) are at risk of giving birth to a child with NTDs based on the red blood cell folate levels. Another study including 970 WRA in nine regions of Ethiopia found that only 32.7% of WRA had optimal levels of serum folate; therefore, 67% had folate insufficiency.⁸ This prevalence of folate deficiency and insufficiency means that many Ethiopian women are at risk of poor birth outcomes. Implementing nutrition interventions such as large-scale food fortification to reach all women with adequate folic acid is a cost-effective and efficient way to prevent folate deficit NTDs.

On average, 1.86 per 1,000 live births are affected by NTDs around the world. However, there is wide variation in NTD incidence across the globe, and this burden is disproportionately high in low- and middle-income countries in Asia and Africa. In developed countries such as the United States, China and Canada, it has been reported that after folic acid fortification and supplementation, the non-folic acid preventable NTDs rate is 0.5-1.0 per 1,000 live births.





PREVENTION OF NEURAL TUBE DEFECTS THROUGH LARGE-SCALE, MANDATORY FOOD FORTIFICATION

Food fortification is one of the high-impact interventions that can reduce the high burden of micronutrient deficiencies. One of the most effective and efficient ways to increase folate status in women is through large-scale, mandatory food fortification. WHO recommends women ingest 400 micrograms of folic acid daily from fortified foods or supplements (that is, in addition to folate already provided by their regular diet) throughout their reproductive age, but at minimum for at least three months prior to their pregnancy and until 12 weeks post-gestation.⁹

WHAT IS FOOD FORTIFICATION?

Food fortification is the practice of deliberately increasing the content of an essential micronutrient, i.e. vitamins and minerals (including trace elements) in a food, so as to improve the nutritional quality of the food supply and provide a public health benefit with minimal risk to health. The process of food fortification directly enhances the nutrient composition of different foods through adding, for example, vitamins, iron, zinc, folic acid or iodine.

Food fortification with folic acid has proven to be a rewarding economic investment. This investment includes two groups of costs: upfront and on-going. These costs includes purchasing folic acid, updating milling machinery, training, marketing, monitoring and evaluation, testing, and compliance. Additional costs may be required for advocacy and education activities.

IMPACTS OF FOOD FORTIFICATION

Food fortification is endorsed as a sustainable, cost-effective intervention with a very high return on investment and proven impact on public health and economic development by the Lancet 2008 and 2013 Maternal and Child Nutrition Series, the Copenhagen Consensus, and Scaling up Nutrition (SUN) Movement.¹⁰ Fortification of food increases serum micronutrient concentrations in several populations and demonstrates positive impacts on functional outcomes. Some of the impacts include: (a) reduction of anaemia by 34%; (b) reduction of NTDs by 41%; (c) reduction of goiter by 74%.¹¹

WHAT IS BEING DONE IN ETHIOPIA?

In Ethiopia, the mandatory standards to fortify wheat flour and edible oil have not been endorsed,¹² while the salt iodization standard has been already developed. Therefore, while in 2005, the national coverage of iodized salt was 4.2%, by the end of 2014, 95% of households had access to iodized salt (containing any amount of iodine), and 42.7% of households had access to adequately iodized salt. In 2018, 88% of households had adequately iodized salt.

Today, more than 100 countries implement salt iodization programs. The good news is that in addition, 86 mandate at least one kind of cereal grain fortification, and over 30 legislate for the fortification of edible oils, margarine and ghee.

WHAT NEEDS TO BE DONE IN ETHIOPIA?

The NTD burden confirms that it is extremely important for Ethiopia to approve the mandatory fortification of commonly consumed food vehicles, including wheat flour, oil and salt (with both iodine and folic acid), to reduce the burden of micronutrient deficiencies and its consequences.

CALL TO ACTION

1. Regional Nutrition Coordination Bodies should submit a request for approval of mandatory fortification of commonly consumed food vehicles, including wheat flour, oil and salt (with both iodine and folic acid.)
2. The National Nutrition Coordination Body should approve mechanisms for enforcement of all food fortification legislations.
3. The National Nutrition Coordination Body should bring together all potential stakeholders and mobilize more investment in food fortification in Ethiopia.



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