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Vitamin A Deficiency

Vitamin A deficiency is "the leading cause of preventable childhood blindness" according to UNICEF with an estimated 250 000 to 500 000 vitamin A-deficient children becoming blind every year, half of them dying within 12 months of losing their sight.

In addition, vitamin A deficiency also increases the risk of death from common childhood conditions such as diarrhoea - it is estimated to claim the lives of 670,000 children under five annually. According to the WHO, mortality rates are increased among children with even mild vitamin A deficiency and enhanced vitamin A intake can reduce the risk of mortality from childhood infections by up to 54%. It is estimated that the deaths of at least one million children would be prevented each year if vitamin A status were improved.

Pupils at Porridge and Rice schools receive yellow sweet potato once a week to provide the vitamin A that they need for healthy development. Just 100 grams of yellow sweet potato provides the recommended daily amount of vitamin A for the average child.

Aside from being an excellent source of vitamin A, sweet potatoes are also a very good source of vitamin C, manganese, copper, pantothenic acid and vitamin B6, potassium, dietary fibre, niacin, vitamin B1, vitamin B2 and phosphorus.

Background

Vitamin A is a group of unsaturated nutritional organic compounds that includes retinol, retinal, retinoic acid, and several pro-vitamin A carotenoids (most notably beta-carotene). Vitamin A has multiple functions:

- growth and development,
- maintenance of the immune system
- good vision

Primary deficiency is seen in children and adults who do not consume enough foods rich in Vitamin A such as yellow/orange fruits (mangoes), vegetables (pumpkin), or animal sources (liver). Babies who are weaned off breast milk too early are also at an increased risk of Vitamin A deficiency.

Secondary vitamin A deficiency occurs as a result of gastrointestinal (gut) abnormalities that lead to poor absorption of the vitamin in food. Vitamin A is absorbed after it has dissolved in fats so a low-fat diet can therefore hinder the absorption of the vitamin.

Zinc deficiency may also disrupt the absorption and transport of vitamin A. Other factors related to secondary vitamin A deficiency include the abnormal production and release of bile, chronic exposure to cigarette smoke, and chronic alcoholism.

Symptoms of Vitamin A deficiency

Vitamin A deficiency leads to some of the following symptoms

- Impaired vision, particularly in dim light (night blindness) leading to the destruction of the cornea and total blindness.
- Impaired immunity and susceptibility to infection
- Whitish lumps at the hair follicles due to hypokeratosis
- Squamous metaplasia of the normal epithelium in respiratory passages and the bladder leads to a keratinized and thickened epithelium meaning a loss of normal function.
- Enamel softening on the teeth leading to cavities

Prevention of Vitamin A deficiency

- Beginning in the pre-natal period an adequate supply, but not excess vitamin A, is important for pregnant and breastfeeding women for normal foetal development and is naturally in breastmilk.
- Breastfeeding should be encouraged as the only form of nourishing the new born.
- Women in the immediate post-partum period are advised to take high-dose supplementation.
- Vitamin A for non-breastfeeding infants can be found in two principal forms in foods:
- Retinol, the form of vitamin A absorbed when eating animal food sources; a yellow, fat-soluble substance, it is found in tissues
- The carotenes alpha-carotene, beta-carotene, gamma-carotene found in plant based foods
- In foods of animal origin, the major form of vitamin A is an ester (alcohol), which is converted to retinol chemically in the small intestine. The retinol form functions as a storage form of the vitamin, and can be converted to and from its active form.
- Vitamin A supplementation of children aged under five is encouraged.
- Vitamin A food fortification is being researched but is not currently a widespread approach to treating mass deficiency.

Vitamin A supplementation

Global efforts to support national governments in addressing vitamin A deficiency are led by the Global Alliance for Vitamin A (GAVA), which is an informal partnership between A2Z, the Canadian International Development Agency, Helen Keller International, the Micronutrient Initiative, UNICEF, USAID, and the World Bank. Joint GAVA activity is coordinated by the Micronutrient Initiative.

While strategies include intake of vitamin A through a combination of breast feeding and dietary intake, delivery of oral high-dose supplements remain the principal strategy for minimizing deficiency. An analysis showed that vitamin A supplementation of children under five who are at risk of deficiency reduces mortality by up to 24%. About 75% of the vitamin A required for supplementation activity by developing countries is supplied by the Micronutrient Initiative with support from the Canadian International Development Agency.

The World Health Organization estimates that Vitamin A supplementation has averted 1.25 million deaths due to vitamin A deficiency in 40 countries since 1998. In 2008 it was estimated that an annual investment of US\$60 million in vitamin A and zinc supplementation combined would yield benefits of more than US\$1 billion per year, with every dollar spent generating benefits of more than US\$17.