

What is Vitamin A deficiency and what foods can help prevent it?

Vitamin A is a micronutrient that is found in food. Everyone needs vitamin A to be healthy, but children between 6 months and 8 years of age and pregnant and breastfeeding women have special additional needs.



Boy with classical corneal scarring (credit M. Hodges)

Vitamin A Deficiency (VAD)

Vitamin A is essential for good health and eyesight. When we eat more vitamin A than we need, the excess vitamin A is stored in the liver. VAD occurs when the body’s stores of this micronutrient have been depleted. The main causes of VAD are inadequate intake of vitamin A due to a poor diet and frequent infections, especially worms, measles, diarrhea and respiratory infections.

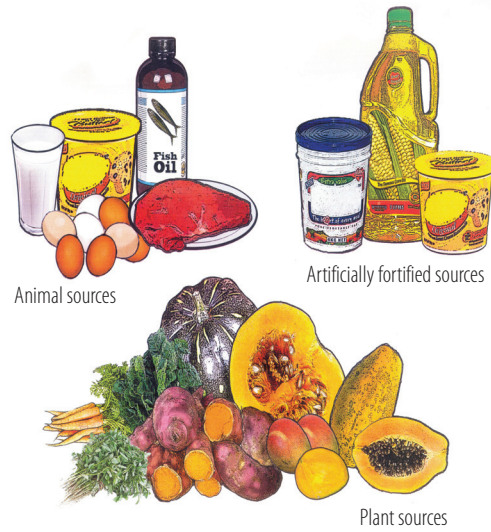
VAD is most common among young children than adults because children grow more quickly and children suffer more from infections and severe malnutrition than adults do.

VAD is common among pregnant and breastfeeding women because they have higher needs as they have to supply the needs of their own bodies and those of the unborn child or baby.

Consequences of VAD

In children, there are 4 major consequences of VAD:

- 1. Poor growth and development:** Vitamin A deficient children often become malnourished because they have poor appetite which leads to weight loss. Malnourished children have a lower ability to fight infection, are more likely to fall ill, causing even more weight loss.
- 2. Increased risk of infection and severity of infection:** VAD especially increases a child’s risk of getting gastro-intestinal and respiratory infections.
- 3. Eye problems:** Children who do not have enough vitamin A can suffer from night blindness (difficulty or inability to see in dim light such as in the early morning or evening). This can progress to conditions that damage the eye such as Bitot spots (foamy white patches on the white part of the eye) and Xerophthalmia (dryness of the cornea and conjunctiva) which can eventually lead to irreversible blindness.
- 4. Death:** Increased risk of infection, greater severity of infection and higher rates of malnutrition means that vitamin A deficient children are more likely to die than well-nourished children. Many studies using vitamin A capsules have shown improving vitamin A status reduces levels of young child mortality by around 23%.



Vitamin A rich foods (Source: PATH)

Note that children can look healthy and still have VAD. Eye problems due to VAD usually do not show up until the deficiency is severe .

VAD occurring in pregnant women can lead to night blindness, miscarriage, the early arrival of the baby, low birth weight, and increased risk of death of the mother.

The prevalence of VAD in a population can be determined by the prevalence of night blindness and other signs of eye problems (Bitot’s spots or corneal lesions) and by testing blood or breast milk samples to assess levels of vitamin A.

Sources of Vitamin A

Vitamin A is available from three food sources:

- Animal foods:** In this form, vitamin A (retinol or preformed vitamin A) is used directly by the body. These foods include fish, liver, kidneys, red meat, eggs, butter, milk and breast milk.
- Plant foods:** Some plants contain beta-carotene and other carotenoids which the human body converts into vitamin A (retinol) in the body. Vitamin A from plant foods is called provitamin A. Provitamin A carotenoids (mostly beta-carotene) are found in palm oil, orange-fleshed sweetpotato and yellow and orange fruits (mango, papaya) and vegetables such as pumpkin and, carrots, and green leafy vegetables (spinach, sweetpotato, and kale).

- Artificially fortified foods: Vitamin A is sometimes added to products such as sugar, margarine, flour, or other vegetable oils.

An important cause of VAD is inadequate intake of vitamin A through the diet. Vitamin A found in foods of animal origin is expensive and not usually eaten by poor households. Some plant sources of vitamin A are more bio-available than others. For instance, 2 units of palm oil converts into 1 unit of retinol when consumed. The conversion rate for mangoes and orange-fleshed sweetpotato (OFSP) is 12 to 1 and for many dark green leafy vegetables it is 24:1 or higher. Adding just a teaspoon of oil or other fat source to a meal containing provitamin A plant foods improves the conversion rate.

The amount of vitamin A needed varies by age and for women, by whether they are pregnant or breastfeeding (Table 1). Note that just 100 grams of a medium intensity coloured OFSP roots meets the daily dietary allowance of a child under 8 years and 200-250 grams the needs of adults.

Table 1. Recommended Dietary Allowances (RDAs) for Vitamin A

Life stage	IU/day	RAE (µg) per day
Non-breastfeeding women (19-65)	2,310	700
Pregnant women	2,567	770
Breastfeeding women	4,300	1,300
Adult men (19-65)	3,000	900
Children, 7-12 months	1,667	500
Children, 1-3 years	1,000	300
Children, 4-8 years	1,333	400

IU=international units. As retinol activity equivalents (RAEs): 1 RAE = 1 µg retinol, 12 µg beta-carotene, 24 µg α-carotene. Source: U.S Food and Nutrition Board, Institute of Medicine, National Academies, 2001.

A diversified diet that includes adequate amounts of foods rich in vitamin A is essential for good health.

Reaching Agents of Change (RAC) Project advocates for increased investment in orange-fleshed sweetpotato food-based approaches to combat vitamin A deficiency (VAD) among children less than five years old and their mothers. RAC also builds institutional capacity to design and implement gender sensitive projects to ensure wide access and utilization of orange-fleshed sweetpotato in selected African countries. Its efforts contribute to the broader Sweetpotato for Profit and Health Initiative (SPHI) which aims to improve the lives of 10 million African families by 2020.

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