



Facts for Feeding

Breastmilk: A Critical Source of Vitamin A for Infants and Young Children

Breastmilk is a hygienic source of energy, essential nutrients, water, immune factors, and many other components that are beneficial for infants and young children. Breastmilk protects against vitamin A deficiency. Prior to the rapid expansion of vitamin A capsule distribution programs in recent years, WHO estimated that more than 250 million preschool children were at risk of being vitamin A deficient.

Facts for Feeding is a series of publications on recommended feeding and dietary practices to improve nutritional status at various points in the life cycle. This issue was prepared in collaboration with leaders in the area of vitamin A: Helen Keller International/Headquarters, HKI/Africa, and the USAID-funded MOST Project.

Vitamin A Requirements

- ♦ Infants and young children need vitamin A for optimal health, growth, and development.
- ♦ Almost all children are born with low stores of vitamin A. During the first six months of life, mothers need to breastfeed exclusively to increase their babies' vitamin A stores.
- ♦ Starting at six months of age, vitamin A must come from breastmilk, vitamin A-rich foods, and, if needed, supplements.

Risk of Vitamin A Deficiency

- ♦ Sub-optimal infant feeding practices reduce vitamin A intake and threaten survival, growth, and development.
- ♦ The risk of vitamin A deficiency is higher for young children whose mothers are vitamin A deficient. Maternal vitamin A deficiency results in reduced fetal stores and lower levels of vitamin A in breastmilk.
- ♦ Infants and young children who are vitamin A deficient are at an increased risk of appetite loss, eye problems, lower resistance to infections, more frequent and severe episodes of diarrhea and measles, iron deficiency anemia, and growth failure. Infections and inflammation accelerate the use and loss of vitamin A.
- ♦ The increased risk of illness leads to an increased risk of death. Studies show that in communities where vitamin A deficiency is prevalent, improving vitamin A status reduces child deaths by an average of 23 percent. Vitamin A is particularly protective against deaths due to diarrhea and measles and may reduce the severity of malaria symptoms.

Summary of Main Points

1. Breastmilk is rich in vitamin A.
2. Exclusive breastfeeding reduces infection and vitamin A losses.
3. Postpartum vitamin A supplementation of lactating women will raise breastmilk vitamin A content.
4. Promotion of exclusive breastfeeding is a strategy for preventing vitamin A deficiency.
5. Vitamin A interventions increase the benefits of breastfeeding promotion for maternal and child health and survival.

Breastmilk's Contribution to the Vitamin A Status of Infants and Young Children

In the first six months of life, breastmilk protects the infant against infectious diseases that can deplete vitamin A stores and interfere with vitamin A absorption. Vitamin A intake of a breastfed child depends on the vitamin A status of the mother, the stage of lactation, and the quantity of breastmilk consumed. From birth to at six months of life, exclusive, frequent breastfeeding can provide the infant with all the vitamin A needed for optimal health, growth, and development. Breastmilk is generally higher in nutritional value than alternative foods and liquids fed to children in developing countries. Consumption of other foods decreases the amount of breastmilk consumed and may disrupt the infant's absorption of vitamins and minerals from the breastmilk. Therefore, **exclusive breastfeeding until six months of age helps ensure sufficient vitamin A intake.**

Vitamin A in the Breastmilk of Infants 0-6 months

| Age of Child | Sources of Vitamin A |
|----------------------|--|
| First few days | Colostrum is the essential first milk produced for the newborn. Colostrum is three times richer in vitamin A and ten times richer in beta-carotene (an active precursor form of vitamin A responsible for the yellow color of colostrum) than mature milk. Because of its high levels of vitamin A, antibodies, and other protective factors, colostrum is often considered the baby's first immunization. |
| Around days 5 to 14 | Transitional breastmilk contains nearly double the vitamin A of mature milk. The high vitamin A content of both colostrum and transitional milk matches the needs of the newborn. |
| Day 14 to six months | Mature breastmilk in well-nourished mothers contains an average of 250 international units (IU) of vitamin A per 100 ml. The concentration of vitamin A in the breastmilk of women in developing countries averages about half this amount. In such cases, providing mothers with a high-dose vitamin A supplement immediately after delivery can ensure that the supply of vitamin A in breastmilk is adequate to meet the infant's daily vitamin A requirement and to build stores. |

Starting at six months of age, it is recommended that infants be fed **appropriate complementary foods in addition to breastmilk** for adequate growth and development.

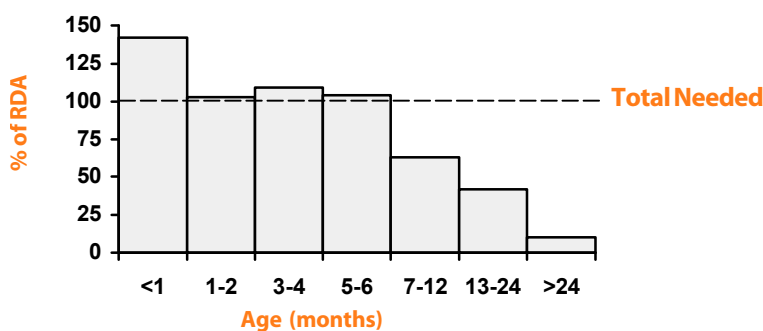
- ♦ **Optimal breastfeeding practices are crucial to help meet the child’s vitamin A needs for the first year and beyond.** In resource-poor settings, children depend on breastmilk for vitamin A and other critical nutrients. A study in rural West Africa found that breastmilk was the most important source of vitamin A for children over one year of age.
- ♦ **Breastmilk remains an important source of energy, fat, and other nutrients.** To be utilized by the body, vitamin A must be consumed with some fat. Breastmilk is richer in fat than most complementary foods and may be essential to facilitate the utilization of vitamin A present in these foods.
- ♦ **Breastmilk’s protective effect against vitamin A deficiency continues throughout infancy and early childhood.** A large study in Bangladesh reported a 74 percent reduction in risk of vitamin A deficiency in

breastfed children aged six months to three years as compared with non-breastfed children. This reduction in risk declined only slightly with age. Even older children (24-35 months) were 65 percent less likely to be vitamin A deficient if they were breastfed.

- ♦ Although its protective effect is greatest in the first six months of life, **breastmilk continues to offer protection against illness and death throughout early childhood.** By providing immune factors and a hygienic source of nutrition, breastfeeding protects against infections that can reduce vitamin A stores, decrease food intake, and interfere with vitamin A absorption.

Breastmilk’s contribution to vitamin A status throughout the first two years and beyond is illustrated in Figure 1.

Figure 1. Percentage of the recommended dietary allowance (RDA) for vitamin A met by breastmilk in developing countries at different ages to 24 months and beyond



Sources: Newman (1993), WHO/NUT/98.1 (1998)


Figure 1 shows:


1. During the first month, breastfeeding provides an opportunity to build up stores of vitamin A.
2. After six months, complementary foods are needed to provide enough vitamin A.
3. Breastmilk continues to be a major source of vitamin A to 24 months and beyond.

Recommended Practices to Improve Vitamin A Status in Infants and Young Children

The risk of micronutrient deficiencies, while present throughout life, is heightened at different stages of the life cycle, such as infancy, early childhood, pregnancy, and lactation. Deficiencies at one stage can have immediate as well as long-term negative consequences for a woman and her child. The following recommendations focus on feeding and dietary practices at different points in the life cycle that can help to ensure optimal vitamin A status at birth and during the first years of life. These recommendations will improve pregnancy outcomes and the survival and health of infants, young children, and women.

Recommendations for Infant and Young Child Feeding

- ♦ **Initiate breastfeeding within about one hour of birth.** *0-6 months*  Early skin-to-skin contact between mother and newborn prevents nutrient loss associated with temperature loss. Early initiation stimulates breastmilk production, providing the newborn with colostrum that is particularly rich in vitamin A.
- ♦ **Breastfeed exclusively for the first six months.** Giving other foods or liquids reduces the consumption of vitamin A-rich breastmilk. It also increases the risk of illness associated with exposure to contaminated water, breastmilk substitutes, and feeding bottles.
- ♦ **Breastfeed frequently.** Frequent feedings help to maintain the supply of breastmilk and vitamin A.

- ♦ **Continue frequent, on-demand breastfeeding.** *6-24 months*  **Gradually introduce clean, nutrient-rich complementary foods beginning at six months.** In addition to breastmilk and other nutritious foods, feed children vitamin A-rich foods¹ daily. Red and yellow fruits and vegetables (such as ripe mangoes, orange sweet potatoes, squash, and carrots) and dark green leafy vegetables are good sources of vitamin A. Fortified foods can provide an additional source of vitamin A. Adding even small quantities of animal products rich in vitamin A (such as egg yolks, cheese, liver, and fish oils/paste) can greatly enhance vitamin A intake.
- ♦ **Breastfeed a sick child during and after illness.** Sick children will often refuse to eat but will continue to breastfeed. Breastfeeding is particularly important when a child has measles. Measles often reduces blood levels of vitamin A. Give sick children over six months of age additional food sources of vitamin A and follow national policies of therapeutic dosing with high-dose vitamin A capsules for measles, xerophthalmia,² chronic diarrhea, and severe malnutrition.
- ♦ **In vitamin A deficient areas, give semi-annual, high-dose vitamin A supplements starting at six months.** Provide 100,000 IU for 6-12 month olds and 200,000 IU for children over 12 months.³

¹ Some foods, particularly those of plant origin (fruits, vegetables, and oils), are rich in carotenoids and other substances that are converted to vitamin A in the body.

² Xerophthalmia is a term used to describe a range of eye problems resulting from vitamin A deficiency.

³ Non-breastfed infants in vitamin A deficient areas should get 50,000 IU of vitamin A as soon after birth as possible. Some countries and nutritionists recommend that in vitamin A deficient areas, all children under six months receive periodic dosing with 50,000 IU of vitamin A at birth and at each of the immunization contacts. These recommendations are being considered by international agencies.

Recommendations for Maternal Nutrition



During pregnancy

- ♦ **Increase food and vitamin A intake.** In areas where vitamin A deficiency is common and vitamin A-rich foods are scarce, *low-dose* vitamin A supplements (less than 10,000 IU per day or 25,000 IU per week) or multiple-micronutrient supplements with appropriate levels of vitamin A may be recommended. Growing evidence points to the need for pregnant women to increase their vitamin A intake through foods and/or supplements. Studies are currently underway to examine the impact of low-dose vitamin A supplements and daily multi-nutrient supplements containing vitamin A on women's vitamin A status, maternal night blindness, maternal death, birth outcomes, and neonatal/infant health and survival.⁴

Postpartum

- ♦ **In areas where vitamin A deficiency is common, take a single high-dose (200,000 IU)⁵ vitamin A capsule as soon after delivery as possible, but no later than eight weeks⁶ postpartum.** This will help to build up vitamin A stores, improve the vitamin A content of breastmilk, and reduce the risk of infection in mothers and infants. A single high-dose vitamin A supplement (more than 10,000 IU per day or 25,000 IU per week) should not be taken during pregnancy because it may harm the developing fetus. Since the risk of pregnancy for lactating women is very low during the first eight weeks postpartum, this is the only time that they should take the high-dose capsule.

During lactation

- ♦ **Increase food and vitamin A intake.** Women's vitamin A requirements are highest during lactation, about 1.5 times greater than for non-pregnant, non-lactating women. Vitamin A stores vary greatly among women and may be precariously low in women whose habitual intake of the vitamin is marginal. Increased vitamin A intake is especially important when the incidence of disease and infections is high and/or food is scarce (such as during the "hungry" season before the harvest, famines, natural disasters, or conflicts).
- ♦ **Plan for a recuperative period between lactation and the next pregnancy.** Use the Lactational Amenorrhea Method (LAM)⁷ and other appropriate family planning methods to ensure at least three years between births and at least six months between stopping lactation and the next pregnancy. This will protect lactation, space births, and help build up vitamin A and other micronutrient stores.

At all times

- ♦ **Diversify the diet to improve vitamin A and other micronutrient intake.** Consume animal products, if feasible. Increase daily consumption of fruits and vegetables. Use vitamin A-fortified foods, when available. If animal products, vitamin A-rich foods, and/or fortified foods are not available, supplements containing vitamin A, zinc, iron, and other nutrients may be needed. Addressing multiple deficiencies prior to pregnancy and lactation will improve women's present health and establish stores to draw upon during pregnancy and lactation.

⁴ A recent study in Nepal showed that supplementing women with low-dose vitamin A (less than 25,000 IU) weekly before, during, and after pregnancy reduced night blindness and decreased pregnancy-related deaths by 40 percent.

⁵ This recommendation is currently under review and may be increased, pending the results of ongoing research.

⁶ Non-lactating mothers in vitamin A deficient areas should be given a high-dose vitamin A supplement no later than six weeks after delivery.

⁷ LAM is a temporary, modern method of birth spacing. The risk of becoming pregnant is less than two percent if the following three criteria are met: 1) no return of menses, and 2) full or nearly full breastfeeding, and 3) less than six months postpartum.

Actions to Support Breastfeeding and Improve Vitamin A Status

National Level

- ♦ Harmonize national nutrition policies and protocol
- ♦ Formulate vitamin A/micronutrient and breastfeeding promotion policies and programs as an integral part of overall health and nutrition improvement, not as isolated activities
- ♦ Promote economic and food policies that improve the availability, access, and demand for vitamin A-rich foods
- ♦ Promote and support food fortification, giving priority to local products that can be fortified. Where food aid is used, select vitamin A-fortified foods and provide them to pregnant and lactating women, as well as to children over six months of age
- ♦ Ensure adequate stocks of vitamin A capsules

Community Level

- ♦ Work with NGOs, community outreach programs, and extension agents in all sectors to incorporate information and support for optimal infant feeding and maternal nutrition into their activities
- ♦ Establish and/or provide training to mother support groups and conduct home visits to share information and experiences on breastfeeding and complementary feeding
- ♦ Use local communication channels (mass media, schools, community events, marketplace, community-based distribution systems, etc.) to disseminate information on optimal infant feeding practices, maternal nutrition, and vitamin A
- ♦ Increase availability of vitamin A-rich foods through school and community gardens, fisheries, fruit trees, and animal husbandry (raising hens, chickens, rabbits, and other small animals)

Household Level

- ♦ Solar dry seasonal fruits and vegetables or air dry them out of direct sunlight to provide a source of vitamin A throughout the year
- ♦ Serve vitamin A-rich foods with a little fat (oil, butter, peanuts) to increase utilization by the body
- ♦ Plant home gardens with a variety of vitamin A-rich vegetables

In vitamin A deficient areas, improving vitamin A status reduces child deaths by an average of 23 percent.

Health Facility Level

Antenatal Contact

- ♦ Counsel on early initiation of breastfeeding, feeding of colostrum, and frequent, exclusive breastfeeding
- ♦ Assess nutritional status and encourage increased energy intake, a varied diet, including vitamin A-rich foods, and reduced workloads during pregnancy
- ♦ Discuss family planning options that protect lactation, including LAM
- ♦ Educate on parasite prevention, treat parasite infections, and follow national guidelines for the prevention and treatment of iron deficiency anemia

Delivery and Immediate Postpartum Contact

- ♦ Facilitate early initiation of breastfeeding, counsel on frequent and exclusive breastfeeding, help establish good breastfeeding skills (proper positioning and attachment), and refer to breastfeeding resources in the community
- ♦ Administer a single high-dose vitamin A supplement to mother (do not give for home consumption) immediately after delivery
- ♦ Assess nutritional status and counsel mother on increasing energy intake, consuming a varied and vitamin A-rich diet, and reducing workload throughout lactation
- ♦ Discuss family planning options that protect lactation, including LAM

Postnatal Contact

- ♦ Assess breastfeeding practices and encourage and support exclusive breastfeeding for six months
- ♦ Provide maternal nutrition counseling, reinforcing the need for increased energy intake, a varied and vitamin A-rich diet, and reduced workload
- ♦ Administer a single high-dose vitamin A supplement to a lactating woman if she is still within the eight-week postpartum period and has not yet received it
- ♦ Discuss family planning options that protect lactation, including LAM
- ♦ Educate on parasite prevention, treat parasite infections, and follow national guidelines for the prevention and treatment of iron deficiency anemia

Well-baby Contact (Growth Monitoring and Immunizations)

- ♦ Provide nutrition assessment and counseling, reinforcing the mother's need for increased energy intake, a varied and vitamin A-rich diet, and reduced workload
- ♦ Counsel on exclusive breastfeeding, timing for the introduction of appropriate complementary foods, the importance of vitamin A-rich foods in the child's diet, and practical ways of enriching the child's diet using local foods
- ♦ Check and complete vitamin A supplementation protocols for older infants and young children
- ♦ Check and complete mother's vitamin A supplementation (if within eight weeks postpartum)
- ♦ Discuss family planning options that protect lactation, including LAM
- ♦ Administer 50,000 IU vitamin A supplement to non-breastfed infant under six months at the first contact

Sick Child Contact

- ♦ Assess and counsel on breastfeeding and adequate and appropriate complementary feeding during and after illness
- ♦ Check and complete vitamin A supplementation protocols; follow national policies of therapeutic dosing with high-dose vitamin A capsules for measles, xerophthalmia, chronic diarrhea, and severe malnutrition

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For more information visit our website at www.linkagesproject.org

or contact us: email: linkages@aed.org

phone: (202) 884-8221

fax: (202) 884-8977



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