

Vitamin A supplementation and the control of vitamin A deficiency: Conclusions

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It was the consensus among all meeting participants that their conclusions concerning vitamin A supplementation should be understood as applying to populations in countries or areas where vitamin A deficiency is a public health problem, including HIV-infected populations. Additionally, it was strongly emphasized that for success, a multipronged approach to the elimination of vitamin A deficiency is needed. Food fortification and dietary diversification, including an increased consumption of vitamin A-rich foods, are key components in any strategy to control vitamin A deficiency. Efforts to promote these strategies should be pursued while implementing supplementation activities.

Infants under six months and postpartum women

Liver stores of vitamin A at birth are sufficient to supply an infant's requirements for only a few days, even if the mother is well-nourished during pregnancy. Theoretical calculations and limited evidence suggest that intakes of 125 µg RE per day are needed to prevent xerophthalmia and faltering in growth, but are not enough to allow for accumulation of stores and may not prevent other functional consequences of vitamin A deficiency. Similar calculations and evidence suggest that intakes of 300 µg RE per day are needed to allow accumulation of adequate stores (at least 20 µg/g in the liver) by six months and to meet all other needs.

The breastmilk vitamin A concentration of well-nourished women is at least 50 µg/dl. In regions of the world where vitamin A deficiency is a problem,

breastmilk vitamin A concentrations are lower. In most regions of the world, initiation of breastfeeding is nearly universal; however, exclusive breastfeeding for six months is very rare. Therefore, it is important to consider that when breastmilk vitamin A concentrations are below 50 µg/dl or when breastmilk intake volumes are less than 600 ml per day, vitamin A intakes will not be sufficient to promote adequate vitamin A stores by six months of age.

There are two options for improving the vitamin A status of breastfed infants: improving the vitamin A status of mothers, and thus the vitamin A content of breastmilk; or supplementing the infant. Both strategies should be employed. Breastfeeding mothers need to receive more vitamin A postpartum. The current policy of giving them 200,000 IU of vitamin A during postpartum is not enough to meet their increased vitamin A requirements for lactation during that period. Nonbreastfeeding women can also benefit from postpartum doses of vitamin A to replete their own liver stores.

It is considered that increasing the postpartum dose of vitamin A to 400,000 IU will be an effective way to increase the mother's vitamin A status and breastmilk content. The safety of a 400,000-IU (120,000 µg RE) dose has been confirmed. To avoid operational confusion, both breastfeeding and nonbreastfeeding women should receive the increased dose within their respective safe infertile periods.

The 400,000-IU (120,000 µg RE) vitamin A supplement should be administered either at the time of delivery or within the safe infertile postpartum period, that is, within eight weeks for breastfeeding women and within six weeks for nonbreastfeeding women. It should be given as two doses of 200,000 IU (60,000 µg RE) each, the first dose immediately after delivery and the second dose later on within the safe infertile postpartum period. It is important that the second dose be given at least 24 hours after the first dose, when the first dose will have been metabolized and taken up by the liver. However, a longer interval is preferred, because it will allow for better retention

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of the second dose. In situations where the mother cannot be recontacted any time soon after birth, a single dose of 400,000 IU (120,000 µg RE) could be given at once, but this should be considered as exceptional and avoided as much as possible, because the evidence that a single dose of 400,000 IU (120,000 µg RE) of vitamin A is safe is still limited and further investigation is needed.

Alternatively, the additional vitamin A can be given as a low dose, either on a daily basis, not exceeding 10,000 IU (3,000 µg RE), or on a weekly basis, not exceeding 25,000 IU (7,500 µg RE) at any time postpartum.

In the absence of cumulative evidence of a reduction in early infant mortality, the main rationale for supplementation of young infants with vitamin A is to achieve improvement in vitamin A status in the second half of infancy. There is ample evidence that an adequate vitamin A status by five months of age improves health and survival. Additional justification of young infant supplementation includes the following:

- » Some children may not be breastfed (particularly in areas of high HIV prevalence where mothers may be opting not to breastfeed);
- » There is benefit to premature and low-birthweight babies;
- » There are immunological benefits to HIV-infected children.

Available data on retinol pharmacokinetics suggest that three doses of 50,000 IU (15,000 µg RE) given to infants under the age of six months would be safe and are likely to be more effective in achieving normal stores at six months of age than doses of 25,000 IU (7,500 µg RE), which have been tested and confirmed safe but insufficient for sustained improvement in status.

Recommendations

1. Exclusive breastfeeding for the first four to six months of life should continue to be promoted as the primary way to prevent vitamin A deficiency in young infants.
2. The postpartum dose of vitamin A to mothers should be increased to 400,000 IU (120,000 µg RE) and should be given as two doses of 200,000 IU (60,000 µg RE). Postpartum supplementation should be given to both breastfeeding and non-breastfeeding mothers, within their respective safe infertile periods, i.e., within eight weeks of delivery for breastfeeding women and within six weeks of delivery for nonbreastfeeding women. Postpartum women should be screened for eligibility to receive vitamin A supplementation at any health contacts,

in particular at the first postpartum visit within the first week following delivery or at the child immunization contact.

3. As an alternative to large-dose supplementation, mothers can receive vitamin A at any time postpartum, given as a low dose not exceeding 10,000 IU (3,000 µg RE) per day or 25,000 IU (7,500 µg RE) per week.
4. Infants should receive three 50,000-IU (15,000 µg RE) doses of vitamin A within the first six months of life. The three diphtheria-tetanus-pertussis (DTP) immunization contacts at 6, 10, and 14 weeks are thought to be some of the best opportunities to deliver and record these doses. However, all health contact opportunities, such as the Integrated Management of Childhood Illness Programmes (IMCI), growth monitoring and under-five clinics, mother's postpartum visit, and family planning consultations should all be used for screening to determine whether a child is up-to-date or is due to receive a vitamin A supplement. If the child is eligible, vitamin A should be administered and the dose recorded on the child's immunization or health card. An interval of one month between doses is recommended.
5. In children over 6 months of age, the current recommendations [1] are still applicable:
 - » Between 6 and 11 months, a single large dose of 100,000 IU (30,000 µg RE) of vitamin A should be given. This dose is important to maintain adequate vitamin A status throughout the first year of life. Ideally, this dose can be given simultaneously with measles vaccine at 9 months, but additionally all health contacts should be seen as opportunities
 - » In children over 12 months of age, a large dose of 200,000 IU (60,000 µg RE) of vitamin A should be given every 4 to 6 months at any health or immunization contact
6. The existing recommendation [2] for distribution of vitamin A with oral polio vaccine during National Immunization Days to all children 6 to 59 months of age, regardless of previous doses received, should be maintained and encouraged.
7. Any doses given should be carefully recorded on the mother's health card or on the child's immunization or health card. It is not recommended or necessary to record doses during National Immunization Days.

Pregnant women

At present there is no new evidence to justify changes in the current recommendations for safe vitamin A dosage during pregnancy [1].

HIV populations

Low serum retinol is commonly associated with HIV infection, although this does not appear to be a causal relationship. It is well established that vitamin A supplementation is safe in HIV-infected individuals in the usual recommended doses. There is no evidence that vitamin A increases HIV viral load, even in vitamin A-replete individuals. In HIV-infected children, vitamin A supplementation has been effective in improving health outcomes, particularly in reducing the incidence and severity of diarrhea. In populations where HIV is a public health problem, supplementation of children and mothers should follow the schedule described above.

Treatment of sick children

There are several reasons for providing vitamin A supplements to sick children at the health facility:

- » There are specific diseases for which vitamin A supplementation has a beneficial effect on the clinical outcome of an acute illness.
- » Each sick child visit should be considered an opportunity for ensuring that children are up-to-date with their regular vitamin A prophylaxis.
- » Children with a current illness are often likely to experience a further episode in the near future, and vitamin A supplementation will decrease the inci-

References

1. WHO/UNICEF/IVACG Task Force. Vitamin A supplements. A guide to their use in the treatment and prevention of vitamin A deficiency and xerophthalmia. 2nd ed. Geneva: World Health Organization, 1997.
2. WHO/UNICEF. Joint statement: policy and operational questions relating to vitamin A and EPI/NIDs. Geneva: World Health Organization, July 28, 1998.

dence, prevalence, and severity of certain key childhood illnesses (comorbidity) and reduce mortality.

There is well-established evidence for a beneficial effect of vitamin A supplementation in the treatment of measles. Vitamin A treatment is also required in the management of severe malnutrition to prevent keratomalacia. Vitamin A has not been demonstrated to have a positive effect on the clinical outcomes of acute diarrhea but might help reduce the severity of future episodes. Vitamin A supplementation does not have a beneficial effect on pneumonia and is associated with a mild increase in respiratory symptoms, including cough, but not an increase in predisposition to pneumonia.

There are several conditions for which new information is required about the role of vitamin A supplementation in the management of childhood illnesses. These include persistent diarrhea, dysentery, tuberculosis, malaria, meningitis, leprosy, parasitic infections, septicemia, and all HIV-associated infections.

Recommendations

1. The current recommendations [2] of using vitamin A supplementation for the treatment of measles and severe malnutrition are fully supported.
2. There is endorsement for the existing IMCI guidelines of using any sick child contact to screen for previous doses of vitamin A supplements and administering a supplemental dose if it is due.

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