Vitamin A supplementation for refugees and famine victims

P. Nieburg, R. J. Waldman, R. Leavell, A. Sommer & E. M. DeMaeyer

Reports about recent famine victims and refugees have described the occurrence of xerophthalmia and resultant blindness related to severe vitamin A deficiency. These populations are subject to high prevalences of childhood protein-energy malnutrition and infectious diseases, pre-existing marginal vitamin A status, and inadequate levels of vitamin A in relief rations. In order to prevent unnecessary morbidity and mortality when any of these risk factors arise, famine victims or refugees should receive vitamin A supplements as an early and essential component of the nutritional support provided by relief agencies. Such supplementation should not await the results of nutrition or blindness surveys but rather should be a standard component of the maternal and child health care provided to the affected population until sufficiency of dietary vitamin A has been clearly established.

INTRODUCTION

Health care workers have long recognized the occurrence of xerophthalmia related to vitamin A deficiency during periods of acute food shortage, a condition that was first reported in the Irish Potato Famine of 1845–50 (1). Major epidemics occurred among children living in poorhouses at that time when, for economic reasons, skimmed milk was substituted for whole milk in the relief ration. Subsequently, numerous reports have appeared of vitamin A-related blindness among famine victims and refugees (2–5).

Background

In a number of field settings, vitamin A supplementation has been an effective mechanism for preventing blindness (6). For example, in emergency feeding programmes for refugees and famine victims, early introduction of vitamin A supplements and treatment plays an essential role in minimizing preventable blindness and associated morbidity and mortality. The supplementation guidelines that we outline here stemmed from discussions that began in the aftermath of the large influx of refugees into eastern Sudan in 1984–85. Exceedingly high rates of xerophthalmia (2) were observed among these severely malnourished individuals, including cases in older children, pregnant and lactating women, and other adults. The guidelines have been formulated in the belief that these health problems, which were related to severe vitamin A deficiency, could have been anticipated on the basis of prior knowledge and experience. More importantly, such problems can be anticipated in future famines and refugee situations.

Current WHO recommendations for vitamin A supplementation (7, 33) include long-term public health measures such as nutrition education and provision of vitamin A-containing foods. However, these recommendations were not intended for and are usually not practical in famine and refugee situations. These nutritional emergencies are usually characterized by a crisis atmosphere, lack of baseline information, shortage of resources, logistic difficulties, and confusion regarding management responsibilities. Moreover, the available relief rations often do not contain sufficient vitamin A, and ignorance of this fact has sometimes delayed the timely implementation of effective vitamin A supplementation programmes in needy populations. The guidelines presented here are intended to address more accurately the realities encountered in these settings and have been developed to reflect the greater needs of such

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populations, after carefully weighing the risks and benefits of an approach that may differ from those usually followed by national vitamin A programmes.

**Physiological considerations**

Vitamin A (retinol) is an essential fat-soluble vitamin found in dairy products, meat (especially liver), and eggs. β-Carotenes, compounds which can be converted into vitamin A in the body, are found in plant products such as red palm oil, yellow fruits, and dark-green leafy vegetables (7). Vitamin A, which is stored in the liver, plays a vital role in the structure and function of epithelial tissue, particularly in the eye, and also affects growth and immune function (7). In addition, recent data have suggested that vitamin A supplementation may help prevent child mortality and morbidity (8–11).

The following recommended daily intakes of vitamin A in μg retinol equivalents have recently been set for the age groups shown (12): 0–1-year-olds, 350; 1–10-year-olds, 400; 10–12-year-olds, 500; 12–15-year-olds, 600; boys aged 15–18 years, 600; girls aged 15–18 years, 500; adult men, 600; adult women, 500; pregnant women, 600; lactating women, 850. It should be noted that 1 μg retinol or retinol equivalent is equal to 3.33 international units (IU) of preformed vitamin A or 1.83 μg retinol palmitate. An individual's vitamin A status at any particular time depends on the balance between dietary intake, hepatic stores of the vitamin, absorption, and tissue demand. Also, vitamin A absorption is lower from diets with inadequate fat or protein content (13–14), while certain illnesses, including many common infections, may decrease the absorption or increase the need, which may in turn lead to or exacerbate deficiency (14–16).

Ocular signs of vitamin A deficiency are termed xerophthalmia and include night blindness, Bitot's spots, corneal xerosis, as well as corneal ulceration and keratomalacia. The corneal lesions, if not rapidly treated, frequently result in permanent loss of vision. However, even mild vitamin A deficiency without ocular signs of xerophthalmia can have physiological effects (17).

Because of the lower metabolic rates that it produces, protein–energy malnutrition is associated with a decrease in vitamin A needs. Conversely, periods of growth—including catch-up growth during recovery from malnutrition—are associated with increased requirements for the vitamin. Provision of food that has insufficient vitamin A to malnourished children, many of whom may have marginal vitamin A stores, can increase their need for the vitamin and may precipitate xerophthalmia and resulting blindness (13, 18).

Breast milk is the usual—and preferred—source of dietary vitamin A for young infants (15). However, if lactating women are themselves deficient in the vitamin and undernourished, the intake from this source will be limited because of both the reduced volume of breast milk and a lower concentration of vitamin A in it (13, 19).

**Role of diet in the prevention of vitamin A deficiency**

Food that contains adequate levels of vitamin A is the preferred source (Table 1). Diets that are seriously deficient in vitamin A are also likely to be deficient in other essential nutrients, and provision of vitamin A supplements in no way compensates for inadequate dietary levels. However, since international agencies consistently are unable to provide relief rations that contain adequate levels of the vitamin to refugees and famine victims (3, 20, 21), high doses of concentrated vitamin A should be administered to protect the vision and health of both children and adults until adequate diets can be provided.

In this regard, agencies that provide dried skimmed milk as a relief food should supply only such milk fortified with vitamin A (22)—dried skimmed milk that is not clearly marked as fortified must be considered unfortified. A simple qualitative test for vitamin A in dried skimmed milk is available that uses reagents and equipment available even in rudimentary laboratories (23).

**ASSESSING POPULATIONS AT RISK**

**Assessment of population risk factors for vitamin A deficiency**

Populations of refugees and famine victims are often at increased risk of clinically important vitamin A deficiency for several reasons. First, if the population's usual pre-crisis food supply has provided only marginal amounts of vitamin A, the pre-existing prevalence of xerophthalmia may already approach or exceed the WHO thresholds (24) used to identify high-risk areas or groups. Second, in nutritional emergencies, affected populations are deprived of even their usual food supply. Third, the relief rations provided to them may be deficient in vitamin A. Finally, children in these populations often have high relative frequencies of protein–energy malnutrition, diarrhoea, respiratory diseases, measles, and other conditions that, if not prevented, can lead to clinical

VITAMIN A USE IN NUTRITIONAL EMERGENCIES

Table 1. Vitamin A content of commonly used relief foods

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Vitamin A or carotene equivalents (IU) per 100g*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals</td>
<td></td>
</tr>
<tr>
<td>Sorghum</td>
<td>0</td>
</tr>
<tr>
<td>Rice, processed</td>
<td>0</td>
</tr>
<tr>
<td>Wheat, whole grain</td>
<td>0</td>
</tr>
<tr>
<td>Wheat, all purpose flour</td>
<td>883</td>
</tr>
<tr>
<td>Corn</td>
<td>450</td>
</tr>
<tr>
<td>Millet</td>
<td>trace</td>
</tr>
<tr>
<td>Oil, soybean or peanut</td>
<td>0</td>
</tr>
<tr>
<td>Sugar</td>
<td>0</td>
</tr>
<tr>
<td>Milk and milk blends</td>
<td></td>
</tr>
<tr>
<td>Dry whole/full cream milk</td>
<td>320</td>
</tr>
<tr>
<td>Dry skimmed milk (vitamin A fortified)</td>
<td>2200</td>
</tr>
<tr>
<td>Dry skimmed milk (unfortified)</td>
<td>12</td>
</tr>
<tr>
<td>Corn soy milk or instant corn soy milk</td>
<td>1700</td>
</tr>
</tbody>
</table>


signs of vitamin A deficiency. For these reasons, members of such “at risk” populations often start with marginal or inadequate vitamin A reserves and later undergo significant physiological stresses, which produce increased vitamin A requirements at a time when their dietary intake of the vitamin is severely limited.

The vitamin A status of each population that needs or receives relief foods should be evaluated to determine whether it is at risk of vitamin A deficiency. Furthermore, vitamin A supplementation should be a standard component of every general, supplementary, and therapeutic feeding programme for famine or refugee victims associated with any of the risk factors outlined below.

Populations originating from high-risk geographical areas. Children and other high-risk target groups should be provided with vitamin A supplements if the population affected is living in (or has come from) an area where blindness associated with vitamin A deficiency is known or suspected to occur, or if no data are available to evaluate this geographical risk factor.

Evidence for severe vitamin A deficiency in the population. Supplements should be provided to the target groups if any cases of active xerophthalmia are observed among the affected population. The presence of signs of xerophthalmia in even a few children indicates that many more are at risk (23).

Inadequate vitamin A in rations. Supplements should be provided to the target groups if the foods supplied as the general ration (“food basket”) contain an inadequate (<2000–2500 IU per person per day) or unknown amount of vitamin A (23). Health workers should base this assessment on rations actually distributed to individuals or families rather than on what is planned or intended for distribution.

If any of these above-mentioned risk factors occurs, vitamin A supplements are needed. Provision of the vitamin supplements should not await the outcome of a nutrition or blindness survey, nor does it require observation of xerophthalmia or other obvious signs or symptoms associated with vitamin A deficiency. Any decision against providing vitamin A supplements to a high-risk population should be made only after explicit consideration of the dangers of such an omission to the health and vision of the children in that population.

Identifying the target groups for vitamin A supplementation within a population

The primary target group for vitamin A supplements within the refugee or famine-affected population are children aged < 6 years (or of height < 115 cm if reliable age information is unavailable). Supplements can be provided directly to these children in food (including breast milk from their vitamin-A-sufficient mothers) or use of 200 000 IU vitamin A supplements (Table 2). In more severe or more chronic situations, such as those observed in the Sudan in 1984–85 (2). Older children and adults may also be at risk of xerophthalmia and blindness and could receive vitamin A supplements.

Specific recommendations are as follows:

—Children aged from 12 months to 5 or 6 years should be given vitamin A supplements, regardless of their individual appearance or anthropometric measurements (arm circumference or weight-for-height). If age data are not considered reliable, all children of height < 115 cm should be included. Such children should receive 200 000 IU of vitamin A at first contact (e.g., upon registration or camp entry) and every 3 months thereafter. Because the traditional recommendations for administering supplements at 4–6-month intervals have been based on the assumption that approximately half of the recipients’ vitamin A needs are provided by diet (6), children who receive

d See footnote b, p. 689
Table 2. Target groups and recommended preventive vitamin A supplementation doses for refugees and famine-affected populations at risk of xerophthalmia

1. Children aged 12 months—5 years (or height < 115 cm). 200 000 IU every 3 months.

2. Infants aged <12 months: 400 000 IU total dose in the first year of life as follows:
   — if a dose can be assured every 3 months: 100 000 IU to the infant every 3 months plus 200 000 IU to the mother at or within 2 months of delivery; or
   — if 3-month dosing is impractical but 6-month dosing can be anticipated: 200 000 IU to the infant every 6 months plus 200 000 IU to the mother at or within 2 months of delivery; or
   — if any (subsequent) doses to the child are unlikely: 200 000 IU to the infant when examined plus either 200 000 IU to the mother at or within 2 months of delivery or 100 000 IU to the mother if less than 3 months before delivery.

3. Older children and adults: if xerophthalmia is observed, include affected age groups in standard 200 000 IU preventive vitamin A supplementation programme.

* In general, all doses of vitamin A should be documented in the child growth/health record.

relief rations that are deficient in vitamin A will require full (200 000 IU) supplements every 3 months. — Infants aged less than 12 months should receive at least 400 000 IU of vitamin A from various sources during their first year of life. Optimally, they should be given 100 000 IU vitamin A supplements every 3 months (beginning at or near the time of birth) and should be breast-fed by mothers whose own diet contains sufficient vitamin A (>2800 IU per day). If the maternal diet contains inadequate vitamin A, lactating women themselves should receive 200 000 IU of the vitamin at or within 2 months of delivery (7, 25). Furthermore, if the population affected practices postpartum sexual abstinence during lactation, distribution of supplements to lactating women can be considered for longer periods. Prior recommendations for providing lactating women with small daily or weekly doses of vitamin A (7, 25) are probably unrealistic in all but the most organized refugee or famine relief efforts.

Sometimes, although women seek antenatal care, they and their newborns are unlikely to be accessible during the immediate perinatal period. Consequently, if a significant risk of xerophthalmia exists under these circumstances, women can be given 100 000 IU of vitamin A during the last 3 months of pregnancy (23). For this purpose, it may be convenient to administer the vitamin during the third trimester, either when the women receive a dose of tetanus toxoid or at some other contact with the health services.

Breast-fed infants who are unlikely to receive supplements as often as every 3 months and whose mothers have inadequate dietary and supplementary intake of vitamin A are at great risk of vitamin A deficiency. Such infants may need to be given larger doses (200 000 IU) of the vitamin at each supplementation contact (up to two such doses during the first year of life). Although these larger individual doses may slightly increase the risk of transient and self-limiting side-effects, this is far outweighed by the protection from xerophthalmia and other complications of severe vitamin A deficiency.

Older children, adolescents, and adults who are exposed to conditions of chronic drought and famine may have exhausted their vitamin A reserves and may develop xerophthalmia (2). In such circumstances, supplementation programmes should be broadened to include these groups; for example, if xerophthalmia has been observed in children up to 12 years old, all children in this age group should be included in the supplementation programme. However, if conditions are so severe that adolescents or adults are to receive vitamin A supplements, women who are known to be in the first six months of pregnancy should be excluded.

**REACHING HIGH-RISK POPULATIONS**

**Mechanisms for reaching target populations**

Below are outlined various ways of reaching target populations.

— Mass distribution. A mass distribution programme, carried out for one or more days and repeated every 3 months until the crisis is over, can sometimes be the most effective method for delivering vitamin A supplements to refugees or famine-affected populations.

— Supplementary feeding centres or community health centres. These facilities can be used as focal points for distribution of vitamin A provided they provide services to a high proportion of the target population.

— Other distribution methods. Although high-dose vitamin A preparations should be available in hospitals and other health-care facilities to treat individuals with xerophthalmia, such facilities may not be the optimal sites for distributing vitamin A supplements if only a relatively small proportion of the population attend them (6).

Irrespective of which distribution means or sites are chosen for the vitamin A supplementation programme, active outreach is still needed to ensure that children with limited access to health-care facilities or
nutrition programmes benefit. At the planning stages of mass distribution programmes, some factors that should be considered in this regard include geographical isolation, cultural patterns of health and illness care, and the difficulty in convincing both relief staff and intended recipients of the importance of vitamin A supplements. Specific details of outreach programmes will necessarily vary, depending on local circumstances: for example, house-to-house searches for sick children in refugee camps, and house-to-house distribution of vitamin A capsules by local village health workers to supplement famine-affected children not covered by a mass programme.

Supplementation programmes should be preceded and accompanied by education and publicity campaigns on vitamin A supplements (6, 24). Information can be disseminated from health centres, schools, as well as food distribution sites and should, wherever possible, be incorporated into ongoing health education and intervention programmes. Political leaders and senior health workers from the affected communities can help in planning and implementing distribution programmes by providing both the staff necessary to run a programme and advice on presenting it in the most culturally acceptable way. Finally, emergency vitamin A supplementation programmes should be coordinated with similar government programmes as fully as possible without compromising the goal of high supplementation coverage.

Reaching newly identified refugees or famine-affected populations

Many of the guidelines discussed above apply most directly to situations with relatively stable populations. However, an influx of newly arrived refugees into an older, more stable population, or the identification of additional famine victims poses a different set of problems with respect to vitamin A supplementation, since the newly arrived individuals are likely to be at particularly high risk. Registration or screening of refugees when they enter a pre-existing camp can be used as an opportunity to distribute vitamin A capsules and for other interventions such as immunization (26). If such screening is, however, not feasible, health workers should arrange the quickest and best available method of distributing vitamin A to appropriate target groups among newly arrived refugees or newly identified famine victims. In no case should the initial vitamin A supplementation of new "high-risk" arrivals be deferred until the next regular campwide or populationwide distribution of capsules or other concentrated forms of vitamin A.

Selecting target groups for specific curative treatment with vitamin A

As indicated below, some subgroups within a high-risk population are at even greater risk of vitamin A deficiency by virtue of pre-existing malnutrition or current illness (Table 3).

1. Individuals with clinical signs of xerophthalmia. The presence of active corneal lesions (including xerosis, corneal ulceration, and keratomalacia) that are suspected to be due to vitamin A deficiency is a medical emergency. Children aged at least 12 months and adults of either sex with corneal or milder xerophthalmia (Bitot's spots or night blindness) should receive a full treatment schedule of vitamin A consisting of one 200 000 IU capsule on the day of diagnosis, another 200 000 IU on the following day, and a third 200 000 IU dose 7–10 days later (7). Children aged less than 12 months should receive 100 000 IU per dose at the same schedule.

Table 3. Target groups and recommended vitamin A treatment schedules for sick children in high-risk refugee and famine-affected populations

<table>
<thead>
<tr>
<th>Group</th>
<th>Dose of vitamin A and comments (^{a, b})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals with xerophthalmia</td>
<td>Three doses of 200 000 IU, one each as follows, day 1 (when first examined), day 2, and one week later (day 7–10). Such individuals should be included in future preventive supplementation programmes</td>
</tr>
<tr>
<td>Severely malnourished individuals, with or without xerophthalmia</td>
<td>Three doses of 200 000 IU, one each day as outlined above, then 200 000 IU every 2–4 weeks [maximum three additional doses] until nutritional [protein] status becomes stable</td>
</tr>
<tr>
<td>Children with measles</td>
<td>200 000 IU when examined</td>
</tr>
<tr>
<td>Children with diarrhea or lower respiratory tract infections</td>
<td>If not supplemented within 3 months, 200 000 IU when examined</td>
</tr>
</tbody>
</table>

\(^{a}\) All doses of vitamin A should be documented in the child's growth/health record.

\(^{b}\) Children aged < 12 months should receive 100 000 IU vitamin A per dose.
2. Severely malnourished children (or adults). As a standard component of their therapeutic feeding programme, such individuals should receive vitamin A supplements at the beginning of nutritional rehabilitation (27). Persons in this category, e.g., children with weight-for-height <80% of the median value, are a high priority target group because they are likely to have depleted hepatic stores of vitamin A and may have subclinical vitamin A deficiency masked by protein-energy malnutrition. Also, because their vitamin A requirements may increase during nutritional rehabilitation and catch-up growth, they may be at risk of developing symptomatic deficiency at that time (13, 18). In addition, because malnutrition reduces intestinal absorption of vitamin A (6), a single preventive dose may be insufficient to fully replete the stores of the vitamin. These children (or adults) should receive a full three-dose vitamin A treatment regimen (200 000 IU ×3) as described above, with the final dose being given after steady weight gain is established and oedema, if any, is resolved (7, 27). If recovery from kwashiorkor is prolonged beyond 2–4 weeks, an additional 200 000 IU dose of vitamin A may be given at that time (7).

The agency responsible for coordinating vitamin A supplementation in each setting should place high priority on making concentrated vitamin A in capsule or other form available to hospitalized children and to children in therapeutic and supplementary feeding programmes.

3. Children with diarrhoea, measles, or lower respiratory tract infections. Such children are at relatively greater risk of xerophthalmia (14, 16). Health workers treating children with these or other severe infections in high-risk populations should therefore review the status of their patients' vitamin A supplementation to determine whether they have recently received a dose and should examine their patients' eyes for signs of xerophthalmia. Children aged 12 months or older with measles should be given 200 000 IU vitamin A when examined (16), while those aged <12 months should be given 100 000 IU. Also, children with diarrhoea or lower respiratory tract diseases should be given similar doses to these if they have received no vitamin A supplements within the previous 3 months.

Health workers who examine and treat children with the above-mentioned or other acute illnesses in populations at high risk of vitamin A deficiency should keep in mind that children with corneal lesions reflexly keep their eye(s) closed. Children who exhibit this sign should be examined for ocular signs of xerophthalmia, particularly for severe corneal lesions.

Importance of measles immunization in preventing vitamin-A-related blindness

Measles in developing countries has been associated with vitamin A deficiency and with childhood blindness (16, 28, 29). In addition, vitamin A supplementation may decrease measles-associated mortality (29, 30). Therefore, measles immunization and vitamin A supplementation should be seen as complementary approaches to reducing blindness and mortality among refugee and famine-affected children. Measles immunization offers the added benefits of protection against other severe complications of measles. Finally, measles (and other) immunization programmes may offer useful opportunities to carry out vitamin A supplementation.

OBTAINING AND STORING VITAMIN A PREPARATIONS

A single operating agency in each refugee camp or feeding camp should be responsible for procuring and distributing 200 000 IU capsules or another concentrated source of vitamin A. The agency best suited for such a role is that whose programme reaches the greatest number of individuals in need, and this will often be the agency responsible for the supplementary feeding programme. Alternatives are agencies that are responsible for health-care delivery or for general distribution of food rations. Agencies that coordinate refugee or famine relief activities are responsible for identifying which implementing agencies should carry out vitamin A supplementation programmes and for ensuring that such programmes are executed. Coordinating agencies should make prior arrangements to ensure the availability of sufficient quantities of 200 000-IU doses of vitamin A.

Capsules that contain 200 000 IU vitamin A and 40 IU vitamin E are the most logistically feasible vehicle for vitamin A supplementation in emergencies. This oral formulation is as effective as injectable forms of vitamin A (6) and has the added advantages of being easily transported, stored, and distributed. Other concentrated forms of vitamin A that allow easy administration of 200 000 IU doses are equally acceptable. Also, lower-dose formulations of vitamin A (4000–10 000 IU) can be stocked if daily or weekly distribution to pregnant or lactating women is anticipated, but preparations containing 15 000–50 000 IU are inappropriate because they are likely to hamper standard programme efforts by confusing the staff responsible for their distribution. Multivitamin preparations are not an appropriate vehicle for vitamin A supplementation in any setting.

The standard soft, gelatin capsules containing 200 000 IU vitamin A have a shelf-life of up to 2
years when appropriately stored (at 15–25 °C, 35–50% relative humidity, in dark closed bottles) (J. Gmueder, personal communication, 1986). For bulk quantities ordered through UNICEF, costs per 100 capsules are less than US$ 2. Costs from other sources may be higher, depending on source, size of order, and shipping charges. Nongovernmental organizations have access to UNICEF (UNIPAC) supplies on a cost reimbursement basis (S. Eastman, personal communication, 1986).

Specific information about sources, costs, and procedures for obtaining vitamin A capsules is available upon request from UNICEF, Helen Keller International, or, for refugee situations, from the Office of the United Nations High Commissioner for Refugees (UNHCR).

CONSIDERATIONS FOR INDIVIDUAL RECIPIENTS

Administering vitamin A to individuals

Oral vitamin A, administered using any of the dosing methods outlined below, is the preferred preparation. If 200 000 IU capsules are used to deliver vitamin A to small children older than 12 months, the capsule tip should be clipped off with clean scissors and the entire contents squirted into the child’s mouth. In order to deliver 100 000 IU to a child aged <12 months, the first two drops of the capsule contents should be discarded before squeezing the remaining liquid into the child’s mouth. Adults and children should swallow the entire capsule. For other liquid forms of concentrated vitamin A, calibrated spoons, automated dispensers, or other means can be used to facilitate delivery of the exact required dose.

Injectable vitamin A preparations should be reserved for the few situations where the oral route of administration may be ineffective; for example, when a child with xerophthalmia has severe diarrhoea or persistently vomits. In other situations, the superiority of injectable water-miscible vitamin A over oral vitamin A has not been convincingly demonstrated (6).

Adverse effects

Careful attention to the details of distributing vitamin A in community-based programmes can minimize the occurrence of adverse effects. Nevertheless, self-limiting symptoms, such as headache, nausea, vomiting, anorexia, and somnolence, caused by inadvertent administration of excessive amounts of vitamin A over one or more days have been occasionally observed in children given large oral doses of water-soluble vitamin A—a preparation that is not recommended and is no longer available (31).

In all cases of acute excess dosing (>300 000 IU vitamin A) symptoms have spontaneously resolved within hours or a few days. In contrast to the serious problems caused by excessive chronic dosing, long-term sequelae have not been documented with inadvertent administration of a single excessive oral dose of vitamin A (31).

Because of the increased incidence of transient adverse effects, e.g., nausea and vomiting, that sometimes follow administration of 200 000 IU vitamin A, it has been recommended that smaller doses (100 000 IU) be given to young children (7). However, if it appears necessary to administer 200 000 IU to children <12 months old because of difficulties in reaching them more frequently with smaller doses, decision-makers should note that the important benefits of vitamin A supplementation in high-risk famine and refugee settings far outweigh the risk of any transient and self-limiting adverse effects.

Documenting use of vitamin A preparations

The vitamin A intake of individual children should be documented by health workers to identify those not yet covered by an ongoing supplementation campaign, to facilitate programme evaluation, and to prevent acute and chronic overdose.

If vitamin A recipients have permanent immunization or growth record cards, the date and amount of vitamin A they have received should be noted on these, but only after ingestion of the dose has been observed. In addition or alternatively, agencies planning a short-term communitywide programme for distributing vitamin A might consider marking with gentian violet a fingernail of each child who receives a capsule (32). This measure can help outreach workers find children who have yet to receive their vitamin A and at the same time, can reduce the risk of inadvertently giving children a second dose.

MONITORING COVERAGE AND EFFECTIVENESS OF VITAMIN A SUPPLEMENTATION

The methods chosen to assess overall programme coverage and impact will depend on local circumstances. For this purpose, a representative sample survey, in which children or clusters of children in the population are randomly selected for survey, is the method of choice. For example, because vitamin A doses should be recorded on immunization or growth record cards, vitamin A coverage could be assessed by a communitywide sample or cluster survey carried out at the same time that immunization or nutrition status is evaluated. Analysis of such data for children who cannot be documented for vitamin A supplementation can help improve both targeting and coverage of future supplementation programmes.

Comparison of the number of doses of vitamin A
distributed with the size of the target population is not by itself an acceptable method of assessing coverage because it does not permit identification of individuals or groups missed during vitamin distribution. Such comparison also fails to account for second doses inadvertently given to some recipients, nor does it ensure that distributed doses have been ingested.

In contrast, to assess programme impact and identify needed improvements, health workers should monitor the incidence of ocular signs of vitamin A deficiency in the population and investigate the reasons for the failure of affected children to receive vitamin A supplements. Collection of data on the age, sex, ethnic group, illness status, participation in a supplementary feeding programme, and the location of all persons with xerophthalmia can reveal any group among the intended recipients not covered by a communitywide campaign and who will still need supplementary vitamin A. For example, the detection of cases of xerophthalmia among older children in a population would clearly indicate a need to include such children in a broadened vitamin A supplementation programme.

If supplementary feeding programmes are intended to make important contributions to the dietary vitamin A intake of a population, sufficient data on the feeding programmes should be available to permit calculation of the amount of such vitamin A (in the form of retinol) to be provided.

INDICATIONS FOR STOPPING DISTRIBUTION OF VITAMIN A CAPSULES

Provision of sufficient dietary levels of vitamin A to build up adequate hepatic reserves should be a long-term programme goal in relief efforts. However, because diets in refugee camps or for famine relief victims may not satisfy dietary requirements of vitamin A, the use of vitamin A supplements in such settings, once begun, should not be stopped until adequate dietary vitamin A consumption is documented among children in the affected population. In some situations, distribution of capsules or other concentrated forms of vitamin A may need to become a permanent and routine component of the maternal and child health care provided to the population. Should this arise, ongoing supplementation should be coordinated as far as possible with national programme efforts, while keeping in mind the need to provide supplementation at least every 3 months.

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RÉSUMÉ

SUPPLÉMENTATION EN VITAMINE A POUR LES RÉFUGIÉS ET LES VICTIMES DE FAMINES

Les rapports relatifs aux victimes des famines et aux réfugiés ont récemment fait état de cas de xérophthalmie liée à une avitaminose A grave et aboutissant à la cécité. Les populations de réfugiés et celles touchées par la famine présentent une forte prévalence de malnutrition protéino-énergétique de l’enfance et de maladies infectieuses; elles montrent en général un apport préexistant en vitamine A limite et les concentrations de cette vitamine dans les rations de secours sont souvent insuffisantes. Pour éviter une morbidité et une mortalité inutiles lorsque l’un quelconque de ces facteurs de risque surgi, il faut que l’apport vitamique soit inclus dans les éléments de base indispensables des rations offertes par les organismes de secours aux victimes de famines ou aux réfugiés. Il ne faut pas attendre les résultats des enquêtes nutritionnelles ou sur la cécité pour instituer un tel apport, qui doit plutôt faire partie intégrante des soins de santé maternelle et infantile fournis aux populations touchées, jusqu’à ce qu’un apport alimentaire suffisant ait été clairement attesté.

Entre 12 mois et 5 ou 6 ans, les enfants doivent recevoir 200 000 UI de vitamine A tous les 3 mois, jusqu’à ce que l’apport alimentaire soit suffisant, alors que pour les nourrissons de moins de 12 mois 100 000 UI tous les 3 mois suffisent. Dans certains cas, comme cela s’est produit au Soudan en 1984–1985 chez les réfugiés venus d’Éthiopie, il peut également s’avérer nécessaire de fournir un supplément vitamique aux enfants plus âgés, aux adolescents et aux adultes.

Bien qu’il existe diverses possibilités pour corriger la carence en vitamine A, il faut disposer d’un programme de couverture actif pour faire en sorte que le maximum d’enfants à haut risque soient traités. En raison de la forte association entre la rougeole et la xérophthalmie, la vaccination anti-rougeoleuse constitue une autre méthode de prévention des carences graves en vitamine A. En outre, les programmes de vaccination offrent une occasion de plus de distribuer des suppléments de vitamine A.

En faisant très attention, on peut diminuer les effets indésirables spontanément résolutifs de la supplémentation en vitamine A. La distribution de fortes doses de vitamine A
doit être inscrite sur le carnet de santé des enfants. On pourra ainsi évaluer les programmes de supplémentation. Enfin, une fois qu'on a commencé la distribution de vita-
mine A aux victimes de famines ou aux réfugiés, il ne faut pas l'interrompre avant d'être sûr que l'apport alimentaire est suffisant.

REFERENCES
