Successful vitamin A supplementation in Nicaragua

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Introduction

Even though clinically evident vitamin A deficiency (VAD) has not been identified as a significant public health problem in Latin America, sub-clinical VAD in children under 5 years of age (serum retinol <20 µg/dl) has been found to be a serious problem in a number of countries. In the late 1990s, the regional prevalence of sub-clinical VAD from national surveys amounted to about 25% in children (1). Estimated national prevalence rates in three countries exceeded the regional average: El Salvador (36%), Nicaragua (31%) and Peru (30%). High VAD prevalence in Central American countries was found since the mid-1960s, but it was not until the mid-to-late 1970s that some governments formally recognised VAD as a serious public health problem and began to address it. Universal or targeted supplementation, usually linked to immunisations (2), was adopted as a short-term response for at least a temporary improvement in vitamin A status while long-term interventions (e.g. food fortification) were implemented. The greatest advantage of adding vitamin A distribution to immunisation campaigns is that the additional cost is small, whereas the impact on child survival can be significant.

A recent review by the Pan American Health Organization (PAHO) documented achievements in ten Latin American countries where vitamin A supplementation was incorporated into immunisation activities, with increased involvement of human resources from regular health programs and growing interest in strengthening implementation through integrated efforts and regular monitoring (PAHO, 2001). Despite some progress, by 2001 only five countries had country-wide programs, and a number of programmatic constraints precluded achievement of consistently high coverage among children. Nicaragua, a small country with about 5 million inhabitants (about 800,000 children under 5 years of age), has been an outstanding exception. This report briefly describes the positive experience with vitamin A supplementation in Nicaragua utilising an effective strategy that is likely to succeed in other VAD countries.

Nicaragua experience with vitamin A supplementation

Background

VAD was found a significant problem in Nicaragua since the mid-1960s but specific actions were not taken then. In 1993 the Nicaraguan Ministry of Health (MOH), with USAID assistance, carried out a national study to assess the prevalence of sub-clinical VAD in children and of anemia in women and children, and to estimate family and individual food consumption. The study revealed that about 60% of the children 12–59 months of age and 70% of the families consumed less than the recommended amounts of vitamin A per day, and 31% of the children had sub-clinical VAD. With these findings, the MOH nutrition group engaged in creating awareness on the health and development implications of micronutrient deficiencies, including the seriousness of VAD and the need to act. Sensitisation efforts targeted all levels of the public and private sector, academic institutions, politicians and the general population. This resulted in strong political commitment to address VAD as a priority problem.

Supplementation through National Health Campaigns (NHCs)

After contemplating different options, the MOH adopted supplementation as an emergency and temporary measure to control VAD while universal fortification of a staple food could be established3. Vitamin A supplements were officially included in the MOH list of essential medicines. A vertical supplementation program for vitamin A alone was not
seen warranted. The challenge was to secure high coverage of children 6–59 months twice a year. Despite some initial concerns about sustainability of the approach, it was decided that incorporation of vitamin A supplementation into the very successful National Immunisation Campaigns (NICs, “Jornadas Nacionales de Vacunación”) offered the best programmatic option.

NICs, carried out four times per year in the 1980s, were reduced to three times in the early 1990s. In order to secure high coverage twice per year, the scope of the NICs was expanded into an integrated package of preventive mother/child primary healthcare services to be implemented twice (rather than three times) per year. In addition to distribution of vitamin A and iron/folate supplements, the package includes routine immunisations, anti-helminthics medications, health education, oral rehydration salts, contraceptives, chloride for water treatment, and anti-louse medications. Therefore, twice a year National Health Campaigns – (NHCs, “Jornadas Nacionales de Salud”), spearheaded by immunisations, substituted for the NICs. This required establishing a semi-annual cycle of district activities improving facility usage for preventive services, as well as community outreach using schools and households of community leaders and/or “brigadistas” as delivery posts. The policy decision was made early in 1994 and later formalised in the 5-year National Micronutrient Plan 1996–2000. Technical guidelines were developed for implementing the services to be provided, including vitamin A supplementation targeted to children and post-partum women following WHO recommendations.

Under the MOH decentralisation process, the health sector in Nicaragua encompasses 17 Districts or Integrated Local Health Systems (“Sistemas Locales de Atención Integral en Salud, SILAIS”) which enjoy high management and budgetary autonomy. MOH central units provide technical guidance, training and supervision to districts. Implementation of the NHCs is a responsibility of the districts. MOH central units are responsible for setting the stage for coordinating and supporting NHCs implementation twice per year (in May and October) by securing sufficient supplies and providing training as needed to the districts and these, in turn, to the local health services. Media communications support is also provided to districts to timely sensitisate and mobilise communities, and to enlist the long established large cadre of community volunteers (“brigadistas”) in support of the NHCs.

During the NHCs, communities (particularly women and children) are massively mobilised by engaging media, municipal authorities, the church and other community groups, with very active participation of primary school teachers, secondary school and university health science students, community volunteers, traditional birth attendants, the military and non governmental organisations (NGOs). The need to take advantage of the variety of primary healthcare services provided at local health facilities is emphasised. Each NHC may take one week in urban areas and as many as four weeks in rural isolated areas where this is practically the only opportunity for people’s contact with the public health system.

Vitamin A supplementation is only one, albeit a very important one, of the services provided. It is targeted to children 6–59 months and post-partum women, although the latter are not covered by the NHCs. While most immunisation coverage is achieved in the first round of the year, the second round provides an opportunity for booster doses and for reaching children not covered in the first round with the full set of primary healthcare services. Each campaign is carefully planned jointly by the central MOH and the districts, and funded almost entirely from regular budgetary allocations. Up to 1998, the MOH procured vitamin A supplements using its own resources. Since then, supplements have been mostly donated by the Canadian government through the Micronutrient Initiative (MI), UNICEF, Wisconsin Lion’s Club, and the Japanese Government, in response to specific requests based on estimated needs prepared by the districts. In order to increase the coverage achieved through the NHCs, the districts are encouraged to tap any ongoing opportunities for contacts with mothers and children to ensure additional supplement delivery through routine health services.

A simple but effective supervision and monitoring system has been established which, in addition to oversee implementation, periodically provides information on
Population coverage

Vitamin A supplementation coverage rates for children 6–59 months of age from 1994 to 2001, by year and round, are shown in Figure 1. Coverage has gradually increased in both rounds since 1994 and levels higher than 70% have been sustained since 1999, with levels above 80% in the last two years. The average coverage rate by round from 1997 to 2001 amounted to 79% in first rounds and 78% in second rounds. The latter is a remarkable achievement, as getting high second-round coverage rates has been a formidable challenge for many countries. Only 1–2% of the total coverage has been achieved through non-NHC routine health service distribution.

Biological impact

The ultimate biological impact of vitamin A supplementation would be expected as changes in serum retinol levels and, eventually, in infant and child mortality rates. A 2000 National Micronutrient Survey carried out about four months after the second NHC of 1999, with USAID/MOST technical and financial support, revealed a dramatic reduction (72%) in the prevalence of vitamin A deficiency (VAD) in children 12–59 months of age, from 31.1% in 1993 to 8.6% in 2000 (Figure 2). This significant improvement may be mostly attributed to the cumulative effect of vitamin A supplementation, as a result of the consistently high coverage rates in children over the six-year period preceding the survey, given the absence of other specific interventions in the same period. Successive rounds of supplementation may have gradually increased serum retinol levels over time. According to conventional knowledge, most of the effect of a large dose of vitamin A on serum retinol of children is expected to vanish after 3–4 months (6-7); however, studies on the long-term cumulative impact of repeated supplementation rounds have not been reported.

Alternative explanations, e.g. significant changes in the socio-economic conditions of the population and the possible impact of sugar fortification may be reasonably ruled out, as no evidence exists of improved social and economic conditions during the interim period and by the time of the survey in early 2000 the sugar fortification program was just starting. As shown in other countries where sugar consumption is practically universal, fortification would be expected to have a significant mid- to long-term impact on the vitamin A status of the population.
population. Once fortification is fully established, supplementation may need to be targeted only to the youngest children (e.g. under two years) who are less likely to benefit from fortification because of their low sugar intake.

Based on the results of experimental studies (8), a reduction in infant and/or child mortality would be expected as the ultimate biological impact of supplementation, particularly in countries with serious VAD and high levels of child mortality. Interpreting changes in infant/child mortality rates estimated from national surveys is complicated by methodological problems in estimating mortality rates and by the many interrelated factors that may influence child mortality in free living populations. Attribution of eventual changes to specific factors is particularly difficult in developing countries with a secular trend towards consistent decline in mortality rates. Recent trends in estimated infant and child mortality rates in Nicaragua (9) for five-year periods from 1973/78 to 1993/98 are shown in Figure 3. Both infant and child mortality consistently declined by 60–63% in the 20-year period (about 3% per year). There was a downward trend in the rates of decline by 5-year periods up to 1988–1993, e.g. from 30–33% (about 6% per year) between 1973–1978 and 1978–1983 to 4–9% (less than 1-2% per year) between 1983/88 and 1988/93. However, this trend reversed (back to higher rates: 20–22%, about 4% per year) in the period 1988/93 to 1993/98. Interestingly, this acceleration in the rate of mortality decline coincides with the implementation of vitamin A supplementation and, although there might be several potential explanations for such finding, a significant contribution of vitamin A supplementation seems highly plausible.

Key elements for success

A number of factors have been key to successful implementation of vitamin A supplementation in Nicaragua:

- Effective sensitisation at all levels of society, the health system and the community to generate awareness of vitamin A deficiency as a priority problem.
- Strong government political commitment expressed in policy and budgetary decisions and technical guidelines.
- Integration of the supplementation strategy into ongoing nutrition and health activities.
- Well trained and motivated staff who have the necessary knowledge and skills.
- Program ownership by health districts and local units.
- Skilled management of programs and timely supply of supplements.
- Building on a strong health infrastructure and community support.
- A supervision and monitoring system providing timely feedback to health services.
- Effective communication and behaviour change strategies.

Conclusions

Nicaragua provides a successful example of periodic, active, institutionalised, integrated distribution of vitamin A supplements with consistently high coverage. Integrating supplementation as part of a package of basic health services to be delivered twice a year through National Health Campaigns, Weeks or Days is a viable, affordable and effective option to facilitate achievement of consistently high coverage rates, and is more likely to be widely accepted and endorsed by health authorities than specific campaigns for vitamin A distribution alone. As national immunisation
days (NIDs) are scaled down or phased out in many countries, NHCs offer an effective alternative strategy to sustain the delivery of vitamin A to young children at the high coverage rates needed to realise its full potential to reduce mortality. Twice yearly delivery of vitamin A supplements through synchronised NHC distribution yields excellent results, as shown in Nicaragua. Vitamin A supplementation can be made a key component of an integrated package of preventive services designed to improve child survival by establishing a semi-annual cycle of district activities designed to improve facility usage for preventive services, thus high coverage of several key child survival interventions can be achieved all together.

The NHCs can be complemented by routine healthcare services to increase coverage, maintain staff motivation and strengthen long-term sustainability. All routine health service contacts offer opportunities to increase coverage with vitamin A supplements (prenatal clinic visits, immunisation, growth promotion, other Mother and Child Health clinic contacts, and sick child attendance). Although, in principle, integration of supplementation within regular health services is a desirable goal, particularly when the campaign approach is not feasible, this strategy alone has not proved effective in reaching consistently high coverage rates. Moreover, health facility attendance for preventive services tend to drastically decline for older children, making it difficult to achieve adequate coverage of preschool children. However, it offers a sound opportunity to enhance the coverage attained through NHCs and would increase the long-term sustainability of vitamin A supplementation.

**References**