More nutrients, fewer parasites, better learning

Tara Gopaladas

By 1997 it is intended that all of India’s 160 million primary-school children will be given a free daily midday meal. Since 1994 almost 3 million such children in Gujarat, already benefiting from this initiative, have been receiving, in addition, supplements of iron, iodine and vitamin A, and deworming treatment with albendazole. As a consequence there have been significant, highly cost-effective and sustainable improvements in growth rates and haemoglobin levels, and decreases in the prevalence of ocular signs of vitamin A deficiency and in intestinal parasitic infections.

Children cannot benefit fully from primary education unless they are in a satisfactory state of health. It is particularly important that they should be well nourished and free of diseases associated with deficiencies of iron, iodine and vitamin A. Since August 1995, 40 million primary-school children in India have been receiving a free midday meal, and it is intended that by 1997 all of the country’s 160 million children in this category will be doing so. In the State of Gujarat, nearly 3 million primary-school children, already receiving a free midday meal, have also been given iron tablets, vitamin A capsules and iodized salt, in addition to deworming tablets containing albendazole. An evaluation of this initiative has been made by Tara Consultancy Services, a non-governmental organization which works with Partnership for Child Development, of Oxford University, UK.

Setting up and running the project

Focus group interviews were conducted with government officials, teaching staff, parents and schoolchildren before treatment started, in order to assess opinion on the proposed courses of action.

- Midday meal programme officials said that most children suffered from worm infestation and nutritional deficiencies.
- Many children said that they passed worms, felt tired and could not always see properly.
- Parents were generally unaware of these problems.
- All interviewees responded positively to the intended programme. The teaching staff and parents said that they would help to carry out treatment.

The midday meal programme commissioners procured adequate supplies of albendazole tablets (400 mg) and iron tablets (60 mg) and vitamin A capsules (200 000 IU) for almost 3 million primary-school children. Iodized salt was used routinely in cooked meals.

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Pharmaceutical firms transported the products to the districts or talukas where the health officers cooperated in storing them. The officials and organizers of the midday meals programme collected their quotas and dosed the children for whom they were responsible as prescribed by an expert technical committee. Procurement, delivery and receipt of the products were all conducted in a highly efficient manner.

Highly cost-effective and efficient training pyramids were established, with the chief district health officers at the top and the helpers and cooks at the base. The shelf-life of the products exceeded two years, provided they were kept in a dry place and, in the case of vitamin A, away from the light. In the focus group interviews, all providers and receivers exhibited enthusiastic acceptance of the programme.

**Findings and outcome**

Nearly 75% of schoolchildren in a slum area carried infections of *Entamoeba histolytica* and/or roundworms, most of them severe to moderate. Infected children in the age range of 6–15 years were 2 kg lighter and 3 cm shorter on average than non-infected children. The mean haemoglobin levels in infected and non-infected children were 10.4 g/dl and 11.6 g/dl respectively. Children aged 11–15 years showed a more severe depression of haemoglobin than did younger children.

Observations were made on 3000 children in three districts shortly before and a year after two rounds of dosing. It was found that older children benefited more than younger ones. The improvements detected were as follows among children aged 6–15 years.

- On average, dosed children were 1.1 kg heavier and 1.1 cm taller than undosed children.
- After one year the mean haemoglobin level was 12.4 g/dl, whereas before treatment it had been only 10.6 g/dl.
- The prevalence of intestinal parasitic infection fell from 71% to 39%.
- The prevalence of night blindness and ocular signs of vitamin A deficiency fell from 67% to 34%.
- Many dosed children said that they felt more active than previously and that their eyesight in poor light had improved.
- Children who had been infected with worms felt greatly relieved to be rid of them.

Many studies throughout the world have shown that, in general, people on low incomes suffer more from iron and vitamin A deficiencies than from inadequate calorie or protein intake, and tend to be comparatively heavily infected with intestinal parasites that greatly inhibit growth and depress levels of iron and vitamin A. Wherever iodine deficiency disorders are endemic it is essential that all people use iodized salt. Even moderate iodine deficiency can have an adverse influence on the learning process.

Deworming, and supplementation with iron and vitamin A, should be organized as parts of a single strategy. Deworming helps to maintain haemoglobin levels for three to four months. Adequate dietary iron is needed for cognition and physical activity, while vitamin A, as well as being vital to the eyes, combats common morbidities, especially upper respiratory tract infections. Reducing these complaints also reduces absenteeism among schoolchildren.

Though the programme may seem ambitious, its financial requirements are very modest. The annual cost per child of albendazole, iron, vitamin A and iodized salt is approximately US$ 0.50; that of midday meals is about $ 20. Preferably, of course, both the treatments and the midday meals should be given.