

## **A study on the feasibility of distributing iron supplements in school**

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### **Introduction**

A recent national survey of nutrition status has highlighted the prevalence of anaemia among school children. More than one-half (58%) of the children between 5 and 18 year and over one-third (36%) of adolescents (40% of the girls and 32% of the boys) are anaemic (haemoglobin, Hb, levels < 11 g/dL). The prevalence was markedly higher in some provinces than in others, ranging from 72% of preadolescents in the North-Western Province to 50% in Uva Province.

Anaemia in these two groups have long-term consequences as the deficiency is likely to persist into adult life. The same survey showed that one in two non-pregnant women and one in three pregnant women, and one in every two infants and pre-schoolers are anaemic. Iron deficiency anaemia during childhood has adverse effects on cognition (1, 2).

A recent study by the Medical Research Institute (3) has demonstrated the feasibility of distributing iron supplements through schools, and the efficacy of a weekly dose as against a daily dose of supplements. The study also demonstrated the cost effectiveness of such a programme.

This is a report of a study, undertaken in February and March 1998, to

- i. ascertain the response of relevant groups of persons to the possibility of devising programmes for distributing iron supplements through schools to the school-going population, and
- ii. to suggest a feasible and practical programme for reducing iron deficiency among school-children.

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### **Methods**

The study was carried out in 7 provinces.

It was launched with a meeting held in Colombo at which presentations were made to Provincial Secretaries and Provincial Directors of Education and Health on iron deficiency, its consequences and possible interventions. This was followed by workshops in all the provinces (excluding the North and Eastern Provinces). Each workshop brought together about 30 participants from the province, including health and education secretaries, provincial directors, Medical Officers of Health (MOHs), school principals, community leaders, parents and members of school development societies.

Officials of both health and education sectors expressed a commitment to the programme that was discussed, and an initial plan of action was drawn up. A series of action programmes was planned, following progressive awareness raising programmes, going down to zones and finally to the level of the school.

The discussions at these workshops were supplemented with several consultations with subject specialists, officials at decision making levels from the ministries of health and education in the Central Government, and MOHs, in order to formulate a tentative programme which can be implemented in the provinces, with several options and adequate flexibility.

### **Results**

#### **A. Provincial plans from workshop reports**

- i. Issue of iron supplements to school children

There was general agreement that iron supplements should be given to school children. They differed on how and who should administer the supplements. Six provinces accepted the plan for once weekly administration at school to ensure compliance, under the supervision of the class teacher. The Southern Province suggested that, in small and medium sized schools, all children be given iron supplements, while in the larger schools only children identified as being iron deficient at a pre-examination be given iron tablets. The Sabaragamuwa Province was the exception, preferring to refer to the MOH children identified as being iron deficient, and the MOH to issue tablets to parents for administering to their children.

The school teachers are to maintain records and ensure monitoring. The main concern was the possibility of side effects and how they should be handled, if distribution is done at schools.

#### ii. Pre-examination

All provinces recognised the need for a pre-examination prior to administration of supplements, with monitoring every 6 months. Prior deworming and, in malarial areas, treatment for malaria, were advocated.

Most of the provinces suggested clinical assessment by medical officers initially, and periodic monitoring by teachers trained in health science, home science and home economics as well as other teachers. A staggered programme of diagnosis and monitoring, extending throughout the first term of each year, was suggested.

#### iii. Institutional support

All provinces worked out detailed institutional structures providing maximum participation by all concerned. Steering and operational committees, from provincial to zonal and divisional levels, were suggested.

#### iv. Supplies and storage

Supplies were to be channelled through the MOH. A week's supply was to be obtained by

the principal and distributed to the class teacher on the days set apart for iron supplementation.

#### V. Awareness raising

All workshops drew up extensive plans to educate and inform the children, by introducing a health lesson to each class, and then by activities such as debates, poster competitions and health exhibitions. All agreed on the need to use the media to alert parents and the community on the dangers of iron deficiency, and on meeting the problem through changes in the diet as well as through supplementation.

Other suggestions were the promotion of school gardens for fruits and iron rich vegetables, school health clubs, and observing an Anaemia Day in the school calendar.

#### B. A strategy for a school programme

##### 1. Expand and modify the current school medical programme

At present the MOH and his staff carry out a worm treatment programme in selected schools, for children in years 1, 4 and 7. Constraints such as shortage of public health staff, equipment and trained personnel have circumscribed the programme. However, the techniques, forms and procedures are clearly laid down in a health sector manual (4). One of the major draw backs, in the opinion of health authorities, is the perception of the school medical programme solely as a health programme, resulting in the distancing of education officials from the programme. Even within the health sector it is seen as the concern mainly of the PHI.

The active participation of education officials, school principals and teachers, other health officials such as Assistant and Registered Medical Practitioners, Divisional Medical Officers and parents was suggested.

The programme should be systematically planned. An initial bench mark survey of deficiency diseases, including anaemia should be followed by a monitoring examination at the end of 2 years.

These examinations could be staggered, from January to March each year.

Some options to be considered are:

- i. Provinces muster personnel, technicians and hospital facilities for the bench mark and monitoring examinations. The economics of using electronic equipment for Hb levels, be considered.
- ii. Initially, limit programme to years 1, 4, 7 and include 9, to cover adolescents.
- iii. Modify the prescribed forms and health cards to include anaemia. Devise a data and record system for each school, data to be available at provincial level as well.
- iv. In schools of type 1C, 1AB, obtain consent of parents of iron deficient children to administer supplies. If parents so wish, they could take responsibility of administering supplements, provided they ensure compliance. Regular monitoring of programme will be needed to measure its effectiveness.  
  
Supplements will take the form of a combined tablet containing 200 mg ferrous sulphate and 20 microgram of folic acid and a tablet of 100 mg of vitamin C, as recommended by the MRI, to be taken weekly.
- v. Supplementation to be preceded by deworming.
- vi. Train selected teachers to make clinical assessment of anaemia. The medical examination will take place only once a year or once in 2 years.

## **2. Supplies and Storage**

Supplies to be obtained by MOH through the usual channels from the national supplies programme, the school principals to obtain a weeks supply from MOH and class teacher or trained monitor will administer tablets, after lunch or snack. Tablets to be taken in the presence of the teacher.

## **3. Cost sharing**

Parents, at least in schools 1C and 1AB should be requested to pay for the tablets.

## **4. Awareness raising, education and information**

The provinces were ready to commence the programme even in 1998. To begin with, awareness programmes were to be conducted for officials, parents, teachers, community and children on,

- a. effects of iron deficiency
- b. iron rich foods and enhancing absorption
- c. need for supplements
- d. possible side effects

A health related lesson to be started in every class. The NIE to introduce a nutrition component into the school curriculum, in grades 1 to 5 in environmental studies and in grades 6 to 9 in health and physical education.

Adapt material from the Health Education Bureau in innovative campaigns.

## **5. Numbers and Cost**

Bench mark examination, in years 1, 4, 7 and 9 in each province will involve numbers ranging from 93500 in the NCP to about 295,000 in WP. If the examination is to be conducted between January and March, assuming each technician can examine 50 children per day, number of health personnel needed will range from 30 in Uva to 100 in WP. Accounting only MOHs and PHIs the numbers range from 84 in Uva to 224 in WP. If the services of DMOs, RMPs and AMPs are solicited, there should be no shortage of personnel for the bench mark examination. The monitoring examination will be for iron deficient children only and numbers of children and health personnel will be half the figures quoted above.

The numbers of children and health personnel involved are given in Table 1. Cost of the initial medical examination is assessed in Table 2 and the cost of the Hb examination in Table 3. Table 4 summarises the cost of the initial survey and one years supplement.

**Table 1**  
**Children in years 1,4,7,9 – Number of officials required and available**

Province	# of children (1)	Officials required	Officials available (2)			
			MOH	PHI	RMP/AMP	MLT
Western	295200	100	46	178	247	257
Central	191900	60	32	111	224	61
Southern	186500	60	37	145	171	65
N. Western	169400	50	33	113	185	49
N. Central	93500	30	22	73	115	24
Uva	105900	30	20	64	96	20
Sab.	142100	50	22	105	143	36
<b>Total</b>	<b>1184500</b>	<b>380</b>	<b>212</b>	<b>789</b>	<b>1181</b>	<b>512</b>

Source (1) School Census, 1996  
 (2) Annual Health Bulletin, 1996

MOH: Medical Officer of Health; PHI: Public Health Inspector  
 RMP/AMP: Registered Medical Practitioner/Assistant Medical Practitioner;  
 MLT: Medical Laboratory Technician.

**Table 2**  
**Cost of Initial Medical Examinations**

Province	Calculation	Cost per province
Western	Rs. 500* x 100 persons x 60 days	Rs. Mln 3.0
Central	Rs. 500 x 60 persons x 60 days	Rs. Mln 1.8
Southern	Rs. 500 x 60 persons x 60 days	Rs. Mln 1.8
N. Western	Rs. 500 x 50 persons x 60 days	Rs. Mln 1.5
N. Central	Rs. 500 x 30 persons x 60 days	Rs. Mln 0.9
Uva	Rs. 500 x 30 persons x 60 days	Rs. Mln 0.9
Sab.	Rs. 500 x 50 persons x 60 days	Rs. Mln 1.5
<b>Total</b>		<b>Rs. Mln 11.4**</b>

\* Calculation based on allowance of Rs. 500 for medical officer per day.

\*\* This would amount to approximate Rs. 10 per child.

Rs. Mln = millions of rupees.

**Table 3**  
**Cost of Iron Supplements**

Province	Costs Rs.(thousands)
Western	444
Central	290
Southern	280
N. Western	250
N. Central	144
Uva	156
Sab.	216
<b>Total</b>	<b>1,730</b> (approx. 1.7 million)

The maximum cost - according to the MRI study is Rs. 3.24 (inclusive of deworming) per child per week, amounting to Rs. 12.96 per child per month. If one takes Rs. 12.50 per month it will amount to Rs. 150 per year. On the assumption that all children in the years 1,4,7 and 9 are given iron tablets the approximate cost for one year in given above:

**Table 4**  
**Summary of costs (in millions of rupees)**

Province	Cost of Activity			Total
	1	2	3	
Western	3.0	3.0	0.4	6.4
Central	1.8	1.9	0.3	4.0
Southern	1.8	1.8	0.3	3.9
North Western	1.5	1.6	0.2	3.3
North Central	0.9	0.9	0.1	1.9
Uva	0.9	1.0	0.2	2.1
Sub.	1.5	1.4	0.2	3.1
<b>Total</b>	11.4	11.6*	1.7	24.7

1 - Bench mark survey (Table 2); 2 - Laboratory tests 3: iron supplements (Table 3)

\* Laboratory tests - at Rs. 10/= per test the total would come to Rs. 11.6 Mln

The cost per child for the entire programme is about Rs. 20/- per year. Adding another Rs. 10/- to meet the cost of disposable needles and other contingencies, the cost per child will be Rs. 30/- per year or Rs. 2.50 per month.

### Conclusions

The desire expressed by the provinces for awareness programme to be started immediately needs to be acted upon with the assistance of the Health Education officers in the provinces.

The commitment of the workshops to formulate and implement a strategy for distributing supplements in the school is encouraging. Full involvement of the parents in the programme should be aimed at and achieved.

There was a clear commitment to combined action by health and education authorities and officials of other sectors as well.

Participation of all relevant persons - parents, community leaders, village physicians, local administrators and planners - was recognised as the key to success.

A well formulated awareness programme will meet issues relating to side effects and compliance as well as recommend changes in dietary patterns such as inclusion of dried fish and sprats with vegetables. In time such information will enter the vast pool of common knowledge and wisdom within communities around the schools.

A rough estimate of the cost of the programme demonstrates its economic feasibility and affordability of successfully minimising the many adverse effects of iron deficiency anaemia. Schools provide the widest coverage in a captive population for addressing a problem which has such critical implications for the social well being, quality of life and for enhancing economic performance.

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