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SUGGESTED ACTIONS FOR IRON DEFICIENCY CONTROL IN INDONESIA¹

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ABSTRACT

In Indonesia, four target groups were identified for interventions to reduce iron deficiency: infants, schoolchildren, adolescents, and adult women (female employees, pregnant and lactating women). Adequate strategies require not only curative but also preventive actions, need to reach all major risk groups in the society, need components to improve compliance, and be feasible in terms of costs and efforts. Preventive measures should be given more priority so that curative actions can be reduced. It cannot be expected that iron deficiency is alleviated with only one measure. Therefore a set of actions need to be implemented which require not only the support of the government but all parts of the society.

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WORKSHOP RESULTS

During a planning workshop on iron deficiency reduction held in April 1997 in Indonesia, four working groups elaborated several recommendations for further actions. The following report is based on these specifically formulated recommendations for Indonesia. These results could also be applicable for other countries in the region.

Target groups

Considering the still widely spread iron deficiency anemia in Indonesia, there are four target groups who need special attention for interventions:

1. Infants
2. Schoolchildren
3. Adolescents
4. Adult women (female employees, pregnant and lactating women).

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Each target group has its specific problems, therefore recommendations for further improvement of current interventions, additional strategies, research and development need to be adapted to their specific needs and to the feasibility of actions.

To drastically reduce iron deficiency anemia, beside of an adequate efficacy, also effectiveness and efficiency of the programs need improvements. In particular, adequate strategies must

- not only comprise curative but also preventive actions,
- reach all major risk groups in the society,
- contain components which can increase target group compliance, and
- be feasible related to costs and efforts.

As a result, several intervention measures have to be implemented at the same time which should involve not only governmental organisations but all segments of a society such as the non-public sector as well as individual actions.

Interventions

According to the results of the study of Grajeda et al (1), the umbilical cord should be clamped only about one minute after delivery when pulsating of the cord has stopped. This measure improves the total-body iron content of the newborn. However, the cord should not be milked to get more blood into the infants improving further the hemoglobin status since in developing countries this may lead to too high hematocrit level in infants (2).

Adequate colostrum feeding help infants to acquire suitable iron stores. Newborns should be breastfed with the first breast milk, efforts should be made to stop the prelactal feeding which is currently still widely practiced in Indonesia. The bioavailability of iron in breast milk is reduced when weaning food is introduced. Therefore, exclusive breast-feeding should be encouraged till the age of 4-6 months.

Good quality complementary food must include an adequate iron supply in terms of iron quantity and quality. Furthermore, the consumption of iron enhancers should be encouraged and at the same time the consumption of iron absorption blockers should be avoided. As a result, the first food introduced to children should already include fruits, vegetable and meats. Furthermore, processed infant complementary food must be fortified with sufficient iron. Infant formula should contain at least 8 mg Fe (bioavailability at least equivalent to that of iron sulfate) per L.

After the first half of the first year of life with the introduction of complementary food and increased mobility of the children, the risk of parasitic diseases which debilitate the iron status increases. Therefore, deworming from the age of 24 months should be encouraged, particularly in the urban area where sanitation infrastructure is improved and it therefore can be expected that reinfections rates are lower than in the rural area resulting in sustainable changes in worm infestation. Albendazol (200 mg) should be administered on three consecutive days for adequate deworming.

Since 1996, approximately 30% of underfive children in selected deprived villages ("IDT" areas) in Eastern Indonesia receive an iron-enriched syrup. The program uses a blanket

approach with children 1-5 years of age. The program uses a consultation group approach based on experiences on the ground. Therefore, social workers should accompany the

Indonesian villages (IDT) and the program covers the program costs. Information should also be provided for the red cross program. Since the program is distributed by the government, the compensation costs of one week would be covered which is part of

Current particularly to be conducted by the Bogor, assisted sulfate for 16 weeks. The costs of teachers should

Since 1996, companies to be regulated. The costs of this regulation

The iron status of seven placebo treated children. The increase is minimal by the consumption

Despite Indonesia, iron deficiency anemia in women. The compliance of the regular monitoring need to be established organization, see traditional birth control marketing of supplements. According to WHO pregnancy which

approach with the daily dose of 30 mg elemental iron/day (as iron sulfate) during 2 months for children 1-5 years and of 15 mg/day during 2 months for infants 6-12 months. An interagency consultation group (3) has recommended 10 mg Fe (as iron sulfate) per day. Brazilian experiences on the daily administration of a liquid iron supplement show low compliance (4). Therefore, sound ICE (information, education, communication) programs are needed to accompany the costly syrup distribution.

Indonesia has started to support a nationwide school feeding program in deprived villages (IDT villages) which is organized and administrated by the local authorities. Currently the program covers 2.3 million schoolchildren and is planned to expand to 7.2 million in 1997. Information should be provided to the local authorities to utilize the school feeding program also for the reduction of iron deficiency by the selection of adequate foods. Beside of improved dietary intervention, iron supplementation should be integrated into the feeding program. Since the intake of the iron supplement would be together with the snacks distributed by the feeding program, a reduced bioavailability of iron has to be expected. For compensation a higher weekly dose of 60 g Fe as iron sulfate has to be used. The additional costs of one weekly iron supplement comprises Rp 10 (equivalent to 4 US \$ cents) which would compromise 1% of the budget available for 3 snacks per week (Rp 1050). Deworming which is part of another ongoing program should be reinforced.

Currently, there are no intervention programs in Indonesia that are addressed particularly to adolescents. An operational research program in Surabaya and Madura is conducted by the Nutrition Research and Development Center of the Ministry of Health, Bogor, assisted by Helen Keller International. Weekly iron supplementation (60 mg Fe as iron sulfate for 16 weeks) is recommended for female adolescents from the age of 12 years in schools. The costs should be shared by the Ministry of Health and the parents. Parents and teachers should be involved in IEC programs.

Since 1996, the government of Indonesia has delivered a regulation that obligates companies to supply female employees once a week one iron supplement for 16 weeks per year. The costs of the supplementation has to be covered by the employers. The compliance of this regulation should be monitored.

The iron status of non-pregnant women could be further improved by replacing the seven placebo tablets of the contraceptive pills with iron-folate supplements. The price increase is minimal compared to the costs of the contraceptive pills and should therefore paid by the consumer.

Despite the changing feeding patterns that are due to the rapid economic growth in Indonesia, iron supplementation will be still necessary for the next years also in pregnant women. The curative iron/folate supplementation program needs to be continued. To increase compliance of the mothers (5, 6), the supplement distribution system and IEC measures need regular monitoring and occasional improvements. Furthermore, additional distribution points need to be established. Beside of the governmental health services, non-governmental organization, semi-private and private enterprises, religious organizations, pharmacies, traditional birth attendants and mid wives could be used for the distribution and social marketing of supplements. These focal points for supply of iron supplements should be used. According to WHO, deworming pills can be used safely during the 2nd and 3rd trimester of pregnancy which is the same period recommended for the ingestion of the iron supplements.

However, the usage of deworming pills should be studied in a small population group before implementing as a national program.

The implementation of a national comprehensive iron supplementation program according to the recommendations of UNICEF/WHO (7) would require considerable costs from the Indonesian government (8). These costs could be drastically reduced by weekly dosing. Furthermore, weekly dosing may improve compliance (9). Nevertheless, adequate ICE strategies are as well necessary if iron supplements shall be taken on a weekly basis and need therefore be developed (10).

During the last decade, Indonesia has undergone an impressive economic growth and poverty reduction. Within this process of transition the population has to be prepared to increase gradually their responsibility and economic share for health costs and public spending has to be concentrated for the poorest segments of the society. For a stronger involvement of private spending, IEC has to be emphasized to reach households and local community leaders.

Iron fortification of wheat flour is carried out in many countries and has been shown effective in Venezuela (11). It is recommended that wheat flour should be enriched with 20 mg Fe (bioavailability at least equivalent to iron sulfate) per kg flour. In Indonesia, some noodle products had been fortified with 7 mg of elementary iron/100 g of instant noodles. Furthermore in traditional herb beverages ("jamu") for healthy women, ingredients were added to increase the bioavailability of the higher iron content found in the herbs. The fortification of these and other processed food should be encouraged.

Research

Although in Indonesia several efficacy tests had been conducted there is still need for further trails. Further research is necessary to optimize the quantity and frequency of dosing in different age groups.

In Indonesia, there are several sources available on the epidemiological situation of iron deficiency anemia such as the national data of the Household Health Survey and district data of Rapid Assessment which are repeated every three years, as well as many scattered studies conducted throughout the country. The Central Java Nutrition Surveillance System established with the assistance of Helen Keller International is another example that collects systematically hemoglobin concentrations of children below 36 months of age and results will be available in the near future. Furthermore, the development of an Indonesian reference distribution curve for hemoglobin concentrations by the SEAMEO-TROPED Regional Center for Community Nutrition assisted by GTZ and UNICEF will help to interpret the magnitude and severity of iron deficiency in Indonesia. In particular, the information obtained will help to decide at what age in infancy interventions should be started and for how long it is needed.

A routine data collection on anemia is also an imperative for impact evaluation of the iron deficiency alleviation programs in Indonesia. The impact of the on-going supplementation programs for three target groups should be evaluated: Pregnant women, working women and infants of poorer areas of Eastern Indonesia.

Worldwide most studies on efficacy of weekly iron supplementation were conducted in

Indonesia. These age and gender groups were conducted, to analyze different groups. Suggested Do

Suggested Do

Group

Infants (6-18 mo)
Preschoolers (2-6)
School children (7-12)
Female adolescents
Non-pregnant women
Pregnant women

Several studies on iron deficiency anemia in Indonesia have passed the peak of iron deficiency and a better iron supplementation program for preschoolers older than 2 years administered (12) adequate iron status accompanied by

Supplementation of micronutrients is negative interaction inhibiting iron and zinc. Furthermore, limiting nutrients enriched with calcium bioavailability of

Operational supplementation might require different (13) and different

Additional characteristics of iron-enriched foods

Helminthiasis groups. Little is known

Indonesia. These studies encourage the introduction of weekly iron dosing in all vulnerable age and gender groups. Therefore, as a follow-up larger effectiveness studies should be conducted, to analyse compliance and adequate ICE strategies in different ethnic and age groups. Suggested dosing for supplementation is presented in Table 1.

TABLE 1
Suggested Dosing of Iron Supplementation in Different Physiological Stages Related to Daily and Weekly application

Group	Daily application (Mg Fe/application)	Weekly application (Mg Fe/application)
Infants (6-18 months)	10	20
Preschoolers (2-6 years)	10	30
School children (7-11 years)	20	60
Female adolescents (12-17 years)	60	60
Non-pregnant women	60	60
Pregnant women	60	120

Several studies have shown that after the second year of life the prevalence of iron deficiency anemia decreases significantly which is most likely due to the facts that the children passed the peak of the growth spurt in early life and adult food is introduced which offer often a better iron supply. Furthermore, a small study showed that iron supplementation among preschoolers older than two years still showed a significant impact two years after the iron was administered (12). However, more needs to be known about the preventive effect of an adequate iron status during the first two years of life. Therefore, interventions need to be accompanied by monitoring activities to observe the duration of their efficacy.

Supplementation and fortification will become more efficient if administration of multi-micronutrients is considered. However, more knowledge is required on the positive and negative interaction between micronutrients. Particular attention should be brought to the inhibiting interference between iron and zinc, since it is suggested that a larger part of Indonesian children and pregnant and lactating women are not only deficient in iron but also zinc. Furthermore, according to several dietary records, calcium seems to be one of the most limiting nutrients. Therefore, several multi-nutrient supplements and infant formulas are enriched with calcium. However, more studies are required about the grade of reduction of bioavailability of iron through the addition of calcium.

Operational comparative studies on the effectiveness of distribution systems for iron supplementation need to be tested, since the heterogeneous situation in which the society lives might require different alternatives of supply points, such as health posts or village pharmacies (13) and different distribution possibilities (14).

Additional alternatives for food fortification that are adapted to socio-cultural characteristics of Indonesia should be developed. As an example, larger efficiency studies on iron-enriched noodles and traditional herb drinks ("jamu") should be encouraged.

Helminthic infestation is widespread in Indonesia, even in urban, middle-income groups. Little is known on the reinfection rates in different environmental and behavioral

conditions in Indonesia. Concerted action should be taken in university health research centers from different parts of Indonesia to study the interaction between environment, practices and infection of different helminths in different age groups.

Malaria is prevalent in several parts of Indonesia and therefore as well responsible for anemia. There are no clear recommendations available for iron therapy and intervention in malaria areas. Applied research is needed to identify suitable effective intervention strategies.

Implementation of actions

The recommendations concerning adequate birth practices and colostrum feeding should be disseminated to all professionals related to birth attendance and incorporated into their training.

The recommendation concerning the processed infant complementary food should be regulated within the breastfeeding codex.

A task force should be established to monitor and evaluate the implementation of research activities and the effectiveness of iron deficiency alleviation interventions.

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