Prevention And Control Of Anaemia In India: Theory And Practice

B.S. Narasinga Rao

Anaemia is a major nutritional deficiency disorder in India and other developing countries[22]. Large population surveys in rural India[23] indicate that the prevalence of anaemia in India according to WHO criteria[21] ranges from 38-72 percent depending upon age and sex (Table 1). Hookworm disease, malaria and other infections, if present, further aggravate iron deficiency anaemia and increase its prevalence. The most vulnerable groups are pregnant women and preschool children among whom prevalence of anaemia may exceed 70 percent. The main cause of anaemia in India is iron deficiency although folate deficiency contributes to anaemia among pregnant women and preschool children[16].

Etiology: The main cause of iron deficiency is inadequate food intake as well as poor bioavailability of dietary iron[11] in the habitual cereal-based diets. Bioavailability of iron from predominantly cereal-based habitual diets in India has been shown, with radio isotopic technique, to range between 1.5 and 6 percent depending upon the type of cereal in the diet[15]. Apart from phytate, tannins present in Indian diets suppress iron absorption to a significant extent[13]. The chemically determined iron content of the diets eaten in India is apparently high, namely 14.8 mg per 1000 Kcal, but when corrected for the presence of a significant amount (30 percent) of unabsorbable "contaminant" iron, the true dietary iron content reduces to 10.4 mg/1000 Kcal[17]. Iron requirement of Indians recommended recently[6], when expressed on the basis of recommended energy intakes, range from 9.8 to 18.8 mg per 1000 Kcal (Table 2). Thus the "true" iron content of habitual diets of about 10 mg/1000 Kcal, can meet the iron requirements of adult men, children of one to six years and lactating women, provided their dietary intake meets their energy requirements. However, in order to meet the iron requirements of other groups, either the bioavailability of iron from their diets has to be improved or the diets have to be supplemented with additional 3-9 mg of iron per 1000 Kcal.

Energy and iron intakes on Indian diets are highly correlated (r=0.769) presumably because a major proportion of both dietary iron and energy are derived from cereals[11]. Apart from inadequate content of iron, reduced intake of energy (food) which is widely seen among the poor in the country, further reduces daily iron intake. This is particularly so among young children, women and pregnant women. This is evident from Table 3 where dietary iron intakes (corrected for contaminant iron) are compared with RDA. It is, therefore, not surprising that there is widespread dietary iron deficiency in India, particularly among the vulnerable groups who suffer from varying degrees of energy (food) deficiency.

Consequences of anaemia: Anaemia, characterised by decreased levels of circulating haemoglobin and tissue iron contents, is known to lead to several functional abnormalities with health consequences. The consequence of a mild form of anaemia is not yet clearly recognised. Although mild anaemia with haemoglobin levels above 10 g/d is not known to result in any serious impairment of function, moderate to severe anaemia is known to have several functional consequences. They include the following:

Impaired maximal work capacity[4]; decreased immunological competence[2]; behavioral abnormalities and reduced learning ability among children[18]; poor pregnancy outcome[24].

Table 1: Prevalence of Anaemia in Rural India **

		Percent Anaemia Prevalence		
Age (Years)	Sex	Hyderabad Centre	Delhi Centre	Calcutta* Centre
1-5	M + F	65.9	59.0	95.4
6-14	M	55.0	72.4	96.1
	F	65.3	69.4	97.0
15-22	M	38.7	65.1	90.1
	F	69.2	63.7	96.7
25-44	M	80.1	57.3	88.6
	F	71.4	71.3	96.4
≥45	M + F	47.6	59.3	92.4

** Hookworm infestation was present.*

*** Report of Working Group on Fortification of Salt (1982); Am. J. Clin. Nutr. 34: 1442.*

Table 2: Dietary Iron Requirements (RDA) Expressed as mg/1000 Kcal*

Group		Recommended Energy Intake Kcal/d	Dietary Iron Requirement mg/d	mg/1000 Kcal
Children	1-3 Yrs	1240	11.5	9.3
	4-6 Yrs	1690	18.4	10.9
	7-9 Yrs	1950	26.0	13.3
Adolescent Boys	10-12 Yrs	2190	34.2	15.6
	13-15 Yrs	2450	41.4	16.9
	16-18 Yrs	2640	49.5	18.8
Adolescent Girls	10-12 Yrs	1970	18.9	9.6
	13-15 Yrs	2060	28.0	13.6
	16-18 Yrs	2060	29.9	14.5
Adults**	Men	2875	28.0	9.7
	Women	2225	30.0	13.5
	Pregnant Women	2525	37.5	14.9
	Lactating Women	2775	30.0	10.8

** ICMR (1990) Recommended Dietary Allowance for Indians. Report of an Expert Group.*

*** Reference person with moderate activity.*

Table 3: Dietary Iron Intake by Indians and its Adequacy

AGE (Years)	Sex	RDA for Iron mg/d	Average* dietary iron intake	Percent Adequacy
1-3	M + F	12	7.7	64
4-7	M + F	18	11.0	61
Adult	M	28	22.5	89
	F	30	19.7	63
Pregnant Women		38	17.1	45
Lactating Women		30	23.7	79

** Corrected for contaminant iron (30%)*
Iron absorption from diets. Men and Children 3%, Women 5%, Pregnant women 8%.

Although a moderate degree of anaemia may not seriously affect day-to-day work, most of which corresponds to sedentary to moderate level of activity, impaired work capacity is seen only in those engaged in hard physical labour with moderate to severe anaemia[22]. Iron deficiency anaemia with haemoglobin level below 10 g/dl is known to reduce cell mediated immunity[20]. Anaemia of pregnancy is known to cause increased maternal morbidity and mortality; increased fetal morbidity and mortality; increased risk of low birth weight.

The Control Of Anaemia In India

Iron fortification programme: The two obvious approaches to the control of anaemia are:

- Increasing the iron content of the diet by inclusion of iron rich foods like green leafy vegetables and/or enhancing iron bioavailability in the existing diets by inclusion of foods rich in absorption promoters like ascorbic acid and animal foods like fish and meat[22]. This approach – important as it is – is a long-range effort which may not yield results in the immediate future.
- The alternative approach is to increase iron intake through fortification of a universally consumed food item with iron. Iron fortification has been attempted in several countries[7], and in India a highly successful technology for the fortification of common salt with iron has been developed[14].

Iron fortified salt has been extensively tested in the community[10,23] and its effectiveness in improving iron status and reducing the prevalence of anaemia has been clearly demonstrated. The merit of this technology is that the vehicle used for fortification, namely salt, is universally consumed by all segments including the poor among whom anaemia is much more prevalent.

Although the technology for the fortification of salt has been available for the past one decade, it has not been introduced on a large scale to combat iron deficiency anaemia in India, despite being strongly recommended[23]. Iron fortified salt is currently being produced on a small scale only by a few private manufacturers and by the Food and Nutrition Board of the Ministry of Food and Agriculture. Large-scale introduction of iron-fortified salt is currently being organised only in Tamil Nadu by the Tamil Nadu Government with support from UNICEF, Food and Nutrition Board and Tamil Nadu State Industrial Corporation.

A possible reason for the hesitation to introduce the fortification programme on a countrywide scale may be the apprehension that it might impede and complicate the important ongoing salt iodation programme to combat iodine deficiency.

In view of this, a new technology for the double fortification of salt with iron and iodine has been recently developed[12]; and this is currently undergoing field evaluation. The double-fortified salt could be introduced in areas of the country where both anaemia and goitre are prevalent and iron-fortified salt could be introduced in the rest of the country where only anaemia is prevalent. The same formula developed for the double fortified salt can be used for the manufacture of iron fortified salt also by omitting the addition of iodine.

If the iron balance in the total population is improved through iron-fortified salt, the anaemia prophylaxis programme among pregnant women through distribution of folifer tablets will have better success. Iron fortification of salt is being suggested as an adjunct and not as an alternative to the present anaemia prophylaxis programme.

Anaemia prophylaxis through supplementation of medicinal iron (tablets): The most vulnerable groups with regard to anaemia prevalence are women, pregnant women and preschool children. In the background of widespread prevalence of anaemia among women, the stress of pregnancy with its increased demand for iron further aggravates anaemia. Dietary iron requirement during the second and third trimester of pregnancy is 25 mg/1000 Kcal. A normal diet with 10 mg/1000 Kcal can hardly meet the iron requirement during pregnancy. Therefore additional iron supplementation is needed in the form of medicinal iron. This widely recognised therapeutic iron suplementation is recommended during pregnancy even for women who start their pregnancy with normal haemoglobin levels. If a woman starts her pregnancy not with a normal level of haemoglobin but with various degrees of anaemia as it happens with

Table 4: Daily Dose of Elemental Iron Required to Correct Anaemia and to Provide for Pregnancy Needs

Haemoglobin level (g/dl)		Daily Iron Requirement For (μg/Kg/d.)			Daily iron needed for a 45 Kg woman; absorbed dose (mg)	Daily dose of iron supplement (mg)**
Initial	Final	Correcting anaemia	Pregnancy demand*	Total		
12	12	0	110	110	5.0	65.5**
11	12	22	110	132	6.0	60.0***
10	12	44	110	154	7.0	70.0
9	12	66	110	176	8.0	80.0
8	12	88	110	198	9.0	90.0
7	12	110	110	220	10.0	100.0

** Assuming 75% of total iron requirement to be provided during the last 100 days.*
***Absorption 8% in non-anaemic*
****Absorption 10% in anaemic (Hb < 11 g/dl).*

the majority of pregnant women in our country, therapeutic supplementation to such women should cover *both* her requirements of iron during pregnancy *plus* the amount needed to correct the existing anaemia[3,7].

Dosage of iron supplementation: The dosage of elemental iron to be used in the therapeutic supplementation during pregnancy has been a subject of much discussion and controversy.

The amount of iron to be supplemented during the later half of pregnancy during the last 100 days can be computed from the initial haemoglobin level, final haemoglobin level to be reached, and the normal requirement of iron during the later half of pregnancy. Such computations for a 45 kg Indian pregnant woman with initial haemoglobin level ranging from 7-12 g/dl are given in Table 4. The average iron absorption from a therapeutic dose of iron given on an empty stomach has been assumed to be 8 percent in case of normal and 10 percent in case of anaemic subjects. Iron absorption in anaemic subjects will be initially high and it declines as anaemia is corrected and the average figure may correspond to about 10 percent. It is seen from Table 4 that the theoretical dose of elemental iron (ferrous) is about 60 mg in non-anaemic and 100 mg in anaemic pregnant women.

The actual dose of iron required and the need for other haematenics like folate and B_{12} in correcting or preventing anaemia of pregnancy has been determined by controlled therapeutic supplementation trials[22]. Two such studies have been reported from India[9,19]. Some significant results of these studies are given in Table 5.

Non-anaemic subjects: In a study by Iyengar *et al*[9] pregnant women were supplemented with 30 mg of iron daily with and without 500 μg folate and 2 μg vitamin B_{12}. The subjects of this study were apparently *non-anaemic* with an average haemoglobin level of 12.8 g/dl. When these subjects were supplemented for 12-16 weeks with a dose of 30 mg iron and 500 μg folate daily, the average haemoglobin level decreased by 1 g indicating that a daily dose of 30 mg of iron is not sufficient to maintain the haemoglobin level unaltered in non-anaemic pregnant Indian women. In a subsequent study, Iyengar[8] studied the effect of supplementation of 60 mg iron plus 500 μg of folate daily to non-anaemic pregnant women with an average haemoglobin level of 13.0 g/dl. At the end of six weeks of supplementation the average haemoglobin remained unaltered at 13.6 g/dl. It can be concluded from these two studies that in non-anaemic pregnant women a daily supplement of 60 mg elemental iron with 500 μg of folate is appropriate to meet the iron needs of pregnancy. Both these studies confirm the need for folate supplementation to obtain optimal response.

Anaemic subjects: In another supplementation study[19 22] amongst Indian pregnant women with varying degrees of anaemia, the haematological response to different daily doses of iron from 30 mg to 240 mg with 500 μg folate and vitamin B_{12} was investigated. The results of this study (Table 5) indicated that a maximal response after 10 weeks of supplementation was obtained with 120 mg iron and 500 μg folate. Increaseing the daily dose to 240 mg did not further improve haemoglobin level to any significant extent. The mean maximal haemoglobin level reached in this study ranged between 10.1 to 11.3 g/dl depending on the initial level of haemoglobin. It would appear that to correct anaemia and to maintain haemoglobin level at 11 g/dl or above, a daily supplementation of 120 mg iron with 500 μg folate for the last 100 days of pregnancy would be required. The haemoglobin level in this study did not increase beyond 11 g/dl even with a dose of 240 mg given for 10 weeks. The explanation for this, however, is not clear. This aspect requires further study.

Table 5: Haemoglobin Responses to Different Doses of Elemental Iron in Pregnant Women with Different Initial Hb Levels

Initial Hb level (g/dl)	Duration of supplementation (weeks)	Final Hb level at different doses of iron and 500 μg of folate (mg/d)				Reference No.
		30	60	120	240	
Non-Anaemic						
12.8	12-16	11.9				9
13.0	6		13.6			8
Anaemic						
7.0	10	8.7	9.1	10.1	10.1	
9.0	10	10.0	10.1	10.7	10.7	19
11.0	10	11.3	11.2	11.2	11.3	

The results of the two supplementation studies in India indicate that along with iron, supplementation with folate (although not vitamin B_{12}) is also essential for maximal response. If the women are non-anaemic with haemoglobin levels above 11 g/dl a dose of 60 mg iron is adequate to maintain haemoglobin levels and apparently meets the iron needs of pregnancy. However, among anaemic pregnant women a dose of 120 mg iron is needed to correct moderate and severe forms of anaemia and to meet the iron requirement of pregnancy.

Although appropriate dosage of iron for therapeutic intervention, to control anaemia of pregnancy, has been determined through pilot supplementation studies, their adoption for the anaemia prophylaxis programme through primary health care is beset with many practical difficulties. One has to contend with side effects like epigastric discomfort, nausea, vomiting and constipation and diarrhoea which oral administration of iron causes. The frequency of such side effects is directly related to the dose of iron. These side reactions do adversely affect compliance. There have been studies designed to minimise these side effects and maximise the acceptance of the tablets[7,22]. A balance must be struck between the dose, time of consumption of tablets, compliance and the desired biological response. Although the ideal objective would be to eliminate anaemia completely by raising haemoglobin level above 11 g/dl, a more modest and practical objective would be to eliminate severe and moderate anaemia by raising haemoglobin level above 10 g/dl which can prevent adverse consequences.

From the studies discussed above, it would appear that two-dose schedule may have to be adopted in the prophylaxis programme. One for the non-anaemics, that is 60 mg iron, and a higher dose of 120 mg (60 × 2) for anaemics. The two-dose (60 × 2) regimen for the anaemics may have less side effects. The practical problem would be to identify anaemic subjects by a simple field test.

Another important hurdle in the successful operation of the iron-folate tablet distribution programme is the lack of motivation on the part of the beneficiaries to accept the tablets and consume them regularly particularly since anaemia, especially in its mild and moderate forms, is not perceived by the community as ill health. A strong educational programme to improve compliance is therefore essential for the success of the programme.

Table 6: Recommendations of the ICMR Task Force on Evaluation of NAAP

1. All the pregnant women to be covered, since there are no simple methods of identifying anaemics.
2. Education of the health functionaries involved in implementation of the programme at all levels.
3. Periodic checking of the quality of tablets.
4. Pilot study to find out the best strategy for delivery of the supplement.
5. Ensuring adequate and regular supply of the supplement at the PHC level.
6. Ensuring the quality of tablets with regard to its contents as well as the coating.
7. A rationalised fixing of targets in different states based on population statistics.
8. To consider alternate strategies as additional measures to control nutritional anaemics.

The Current Anaemia Prophylaxis Programme In India

A study group on nutritional anaemia of the Nutrition Society of India recommended in 1968 an anaemia prophylaxis programme for the eradication of anaemia of pregnancy and childhood[16]. According to this Expert Group, the most practical and expeditious way of doing this is to give supplements of iron and folate to anaemic pregnant woman during the last 100 days of pregnancy. Based on the results of controlled supplementary trials then available and theoretical computations, the Group recommended 60 mg of elemental iron in the form of ferrous compound and 500 μg of folic acid. They recommended at least 50 percent of all pregnant women to be covered during the first five years. They suggested the use of PHC, the subcentre and MCH Centres as outlets for the distribution of tablets. They also gave a plan for distribution of tablets and their quality control. They also emphasised the educational component to motivate the women and periodic evaluation of the impact of the programme.

In pursuance of the above recommendations, the Government of India had set up the National Anaemia Prophylaxis Programme (NAPP) in 1970 in all States of the country. The target population under this programme comprise pregnant women, lactating women, family planning acceptor women (of terminal methods and I.U.D.s) and children of both sexes between one and 11 years (both years inclusive). The supplementation provided under this programme consists of tablets of iron folate containing 60 mg of elemental iron (ferrous sulphate) and 500 μg folic acid for all adult woman beneficiaries. For children smaller tablets containing 20 mg elemental iron ($FeSO_4$) and 100 μg folate are provided. For children who cannot swallow tablets, iron and folic acid in the same dose as in single tablet is given in 2 ml of syrupy liquid.

Each beneficiary is given one tablet daily for a period of 100 days once a year for every year of his/her beneficiary status.

Although the programme has been in operation for more than 15 years, no improvement in anaemia prevalence was discernible as several studies conducted during this period indicated. There were many speculations as to the cause for the lack of impact of the programme. One reason that was strongly advanced was that the dose of iron given to pregnant women was insufficient and there were proposals to increase the dose to 120 or 240 mg/day based on a study in India[19]. A multi-centric field study to test different doses of iron, namely 60, 120, 180 and 240 mg was organised by ICMR; though the study is reported to have been completed the results of this study are not available. However, an evaluation of the programme in 11 states of the country, conducted by the ICMR during 1985-86[5] yielded the following depressing conclusions

- The programme has not made any significant impact on the prevalence of anaemia.
- The important drawback of the programme was that a large proportion of the women did not receive the tablets due to poor supply of tablets to PHC.
- The monitoring of supply of tablets and their distribution as well as compliance were far below the desired level.
- There were also the problems of the poor quality of the tablets.

Apparently the programme has remained all these years as a "low priority" programme! Another aspect of the programme which has not been highlighted is adequacy of production of folifer tablets and the availability of chemicals.

Arising from the evaluation, certain recommendations for the improvement of the programme have been made (Table 6). Another important point that has not been mentioned in the recommendation is the question of dosage of iron. Iron dosage to anaemic pregnant women should be 120 mg/day. It could be delivered as a single tablet or two tablets of 60 mg[3] each,by which side effects can be reduced. There is also a need to improve the appearance of the tablet viz. the changeover from brown to red colour. Hopefully the implementation of these guidelines will improve the programme.

It is clear that present efforts towards prevention and control of anaemia in the country are wholly inadequate. To a considerable extent this could be a reflection of the general inadequacies of our health system with respect to the delivery of health care. With improved outreach, and greater motivation of health workers and of the community, it should be possible to promote better implementation. Better linkages between the ICDS and the health system could facilitate wider coverage.

While medicinal iron supplementation to selected groups at risk is important, the need to augment dietary intake of iron must be recognised as this is the obvious logical approach.

The studies of Agarwal and colleagues[1] indicate that supplementation of iron in pregnancy, after the formation of the placenta, may not result in significant benefit to the offspring. This observation, considered in the light of the fact that anaemia is widespread in adolescent girls well before they enter pregnancy, should serve to underscore the importance of dietary improvement in any programme for combating anaemia.

The author is former Director, National Institute of Nutrition, Hyderabad.

References

1. Agarwal, K.N. *et al* (1990); Functional Consequences of nutritional anaemia. *Proc. Nutr. Society* (in press).
2. Dallman, P.R. (1987): *Am. J. Clin. Nutr.* 46, P. 329.
3. DeMeyer, E.M. (1989); Prevention and controlling of iron deficiency anaemia through primary health care, WHO, Geneva.
4. Hallberg, L., and Scrimshaw, N.S. (Ed.) (1981): Iron deficiency and work performance, INACG, Washington D.C.
5. ICMR (1989); Report of a Task Force Studies on the evaluation of National Anaemia Prophylaxis Programme.
6. ICMR (1990); Recommended Dietary Allowance of Indians. Report of an Expert Group.
7. INACG (1977); Report of Guidelines for the eradication of iron deficiency anaemia. INACG, Washington D.C.
8. Leela Iyengar (1971); *Am. J. Obstet. Gynaecol.* 13.
9. Leela Iyengar and S.V. Apte (1970); *Am. J. Clin. Nutr.* 23:725.
10. Nadiger, H.A., Krishnamachari, K.A.V.R., Nadamuni Naidu, A., Narasinga Rao, B.S. and Srikantia, S.G. (1980); *Brit. J. Nutr.* 43:45
11. Narasinga Rao, B.S. (1983); *Proc. Nutr. Soc.* 28 : P.1.
12. Narasinga Rao, B.S. (1990); Double fortification of salt. *Proc. Nutr. Society* (in press).
13. Narasinga Rao, B.S. and Prabhavati, T. (1982); *J.Sc. Food Agr.* 33:89.
14. Narasinga Rao, B.S., and Vijayasarathi, C. (1975); *Am. J. Clin. Nutr.* 28: 1395.
15. Narasinga Rao, B.S., Vijayasarathi, C. and Prabhavati, T. (1983); *Ind. J. Med. Res.* 77: 648.
16. Nutrition Society of India (1968); Nutritional Anaemia Report of an Expert Group.
17. Prabhavati, T. and Narasinga Rao, B.S. (1981); *Ind. J. Med. Res.* 74: 37.
18. Pollitt, E. and Liebel, R.L. (Ed.) (1982): Iron Deficiency. Brain Biochemistry and Behaviour, Raven Press.
19. Sood, S.K. *et al* (1975); *Quart. J. Med.* 44: 241.
20. Srikantia, S.G., Prasad, J.S., Bhaskaram, C. and Krishnamachari, K.A.V.R. (1976); *Lancet* I: 1307.
21. WHO (1968); Nutritional Anaemia, Report of a WHO Scientific Group *Tech. Rep. Ser.* No. 405.
22. WHO (1975); Technical Report Series 580, Control of Nutritional Anaemia with special reference to iron deficiency.
23. Working Group on Fortification of Salt (1982); A Report. *Am. J. Clin. Nutr.* 34, 1442.
24. Yusufji *et al* (1973): Bull. World Health Organisation, 48, P. 15.

REVIEWS AND COMMENTS

Control Of Anaemia

Anaemia is the most widespread, and yet the most neglected nutritional deficiency disorder in the country today. With minimal inputs, well within our national resources, we should be able to control this problem, if not to eradicate it. Our failure, thus far, to effectively contain this problem is perhaps traceable to a basic defect in our strategy. The facile assumption that anaemia of pregnancy can be combated through the conventional approach of providing iron-folate tablets to pregnant women during the last trimester of pregnancy needs to be critically re-examined in the prevailing context of widespread prevalence of anaemia in our children.

The great majority of adolescent girls of poor income groups in our country today suffer from anaemia. According to WHO criteria, 65 percent to 70 percent of girls between 6 to 14 years of age in Hyderabad and Delhi areas, and a much larger percentage in the Calcutta area (see Table 1 in the above article) were reported to be anaemic. In a considerable proportion the anaemia is of moderate and severe degree.

It is thus obvious that a high proportion of girls in the country are already anaemic (some of them moderately and some severely so) before starting on their pregnancy. Pregnancy only serves to aggravate the pre-existing anaemia.

Under the circumstances, it seems doubtful if the conventional approach of providing 100 or even 200 tablets of iron folate during the last trimester of pregnancy will really meet the situation, even if through efficient management, our health services do succeed in delivering the tablets to pregnant women. We need a radical departure in our strategy for combating anaemia of pregnancy.

Iron folate tablets should be made freely available to all girls in the countryside immediately after the consummation of marriage. Iron folate supplementation in the case of these anaemic girls should start at the time of marriage, not when they are more than half way through their pregnancies. It may be wrong strategy to wait for the arrival of pregnancy. The intake of iron folate tablets by newly married girls should be actively promoted through an intensive education programme. Health workers and anganwadi workers should be encouraged to contact girls immediately after marriage for this purpose as part of a revised plan of operation for control of anaemia of pregnancy. It will be far easier to ensure the acceptance and intake of iron folate tablets in pregnancy, if girls have been properly educated and conditioned in this regard even before the onset of pregnancy.

With this strategy, even if the supply of iron folate tablets to the girls is somewhat irregular and cannot be rigidly ensured on a daily basis (as is bound to be the case given the weaknesses of our health system), the chances of our mitigating the anaemia problems would be far brighter. The additional cost involved may not be great; among newly married girls of poor income group, the time lag between the consummation of marriage and the onset of pregnancy is generally no more than a few months.

C. Gopalan

NUTRITION NEWS

- The meeting of the National Committee for IUNS was held on February 18, 1991, at the INSA office under the chairmanship of Dr. C. Gopalan.
- The sixth Asian Congress of Nutrition will be held on October 16-19, 1991, at Kuala Lumpur, Malaysia. The Scientific Programme includes seven plenary lectures and 20 symposia. Full details of the programme can be obtained from Dr. Chong Yoon Hin, President of the Organising Committee, at the following address: Dr. Chong Yoon Hin, Special Adviser to DG, PORIM, No.60, Persiaran Institusi, Bandar Baru Bangi, 43000 Kajang, Selangor, Malaysia.

FOUNDATION NEWS

- Task Force Meeting on the ongoing project on "Education for better living for rural adolescent girls" was held on February 5, 1991, at the India International Centre, New Delhi.
- Task Force Meeting on the ongoing project on "Effect of supplementary nutrition during the last trimester of pregnancy on the birth weight and subsequent growth of the infants" was held on March 29, 1991, at the India International Centre, New Delhi.

Edited by Ravinder Chadha for the Nutrition Foundation of India, B-37 Gulmohar Park, New Delhi. Designed and produced by Media Workshop. Typeset at Fototype. Printed at Vashima Printers.