

IV

ABSTRACT

A study was conducted in 200 children aged 9 to 24 months to determine the extent and the severity of iron deficiency anaemia and to assess their dietary iron intake with a view to reducing the incidence of iron deficiency anaemia among weanlings by improvement of the commonly used weaning foods.

Of the children 55 % were anaemic according to the cutoff point of 110 g/l of haemoglobin estimation as recommended by the WHO. Estimation of the serum ferritin concentration suggested that 75 % of children were with depleted iron stores. Iron deficiency therefore, appears to be a major cause of anaemia in the study sample.

The dietary intake of iron in most (71%) of the children in the study group failed to meet the WHO recommended daily intake. Of the children who had an adequate dietary iron intake, also there were 66 % with depleted iron stores. The results indicate that the storage of iron in these children did not correlate well ($P > 0.5$) with the dietary iron intake.

On analysis of some traditional weaning foods it was found that the commonly used rice gruel is quite inadequate in energy and nutrient density, whereas the leaf gruel though inadequate in energy and some other nutrients such as protein,

iron, zinc and vitamin C, could be improved by supplementing with a few food items from the family pot itself in order to meet the recommended nutrient intake of the children up to 2 years of age. For example, the protein and energy content could be improved by the inclusion of green gram or cowpea, and inclusion of sprats could significantly increase the protein and iron content, with a slight improvement in the energy content. Moreover, the leaf gruel satisfactorily covers the daily amino acid requirement of the children even up to 2 years of age. This is apparent from the protein quality (as determined by the Net Protein Utilization) of the gruels, which was far superior to that of industrially processed weaning foods (Bilinduposha and biscuits) analyzed.

In addition to the low dietary iron intake, the poor availability of iron present in the weaning foods tested, seems to be responsible for the high incidence of iron deficiency anaemia in these children. The availability of iron in leaf gruels could be increased considerably by replacement of Centella asiatica in these gruels with some other green leafy vegetables such as Boerhavia diffusa, Celosia argeniaea and Alternanthera sessilis. The availability of iron was found to be higher in the different types of boiled weaning mixtures analysed than in the traditional gruels. Using the extrinsic tag method with ⁵⁹Fe an in-vitro

analysis showed that inclusion of ascorbic acid or ascorbic acid rich food items such as tomatoes (20 g) and lime juice (5 ml) increased iron availability from these above weaning foods. Using the same technique with ^{59}Fe and ^{55}Fe an iron absorption study carried out in-vivo on healthy adults also showed that iron absorption from the traditional gruels can be raised three fold with the addition of 50 mg of ascorbic acid per meal.

The results also provide supportive evidence for the view that inhibitory components such as phytate, tannin and catechin present in some of the weaning foods can markedly reduce their iron availability. Of the traditional leaf gruels analysed, those containing less poly phenols had a higher availability of iron. A significant negative correlation ($P < 0.001$) was also seen between iron availability and phytate levels in the weaning foods.

Although the present study shows that traditionally used weaning foods are deficient in certain nutrients especially protein, iron and energy and, locally available food items such as legumes, sprats, green leaves, tomatoes and citrus fruits can be used to overcome these deficiencies with modifications of the composition of the preparations, to reach a more definite conclusion regarding the suitability of these improved formulae for the purpose they were prepared, it is necessary to test their acceptability among children not only in the Galle district but also in the other parts of the country. However, due to limitations of time and finances this could not be done.