

Dietary supplements in pregnancy

PRESCRIBING iron has become a ritual of obstetric practice over the past 40 or more years. More recently iron and folic acid in a single preparation has become the prescription of choice for many practitioners. The arguments for such practice seem simple enough and to many are still unassailable. A minority of women become either iron or folate deficient during pregnancy—sometimes both—and some become anaemic. Prescribing iron and folic acid prophylactically in an appropriate dose to all pregnant women should theoretically prevent such problems. Yet a World Health Organization report published over 15 years ago (WHO, 1965) criticized the blanket administration of iron, in those parts of the world where there is good basic nutrition, as a barrier to further research. Since then the arguments have continued, with firmly held views on both sides. More recently routine vitamin D supplementation has been proposed for Asian women, and a new discussion about the role of multivitamin supplements in the prevention of neural tube defects has begun.

How do the arguments for and against routine supplements of iron, folic acid and vitamins stand at present?

Iron

It is normally accepted that a haemoglobin level of less than 12 g/100 ml is an indication of anaemia in a non-pregnant woman, and that such a level may occur early in iron deficiency before the appearance of hypochromia and microcytosis (WHO, 1965). Using this level of haemoglobin concentration as an indicator of anaemia, between 21 and 80 per cent of pregnant women may be anaemic (WHO, 1968). However, the use of such norms established in non-pregnant populations is fraught with difficulty when applied to a population of pregnant women. The red cell mass increases by 20 to 30 per cent in pregnancy, and plasma volume by some 40 to 50 per cent (Lund and Donovan, 1967), so haemodilution occurs quite naturally. There are also difficulties in assessing the relevance of measurements of iron stores during pregnancy. Assay of serum ferritin—a circulating iron storage protein—is now widely regarded as the most accurate method for assessing the iron stores in the body (Worwood, 1980). Without iron supplements, serum ferritin drops rapidly from early in pregnancy,

but after delivery rises again (Kelly *et al.*, 1977). The fall in ferritin reflects a mobilization of iron stores—in the early months for maternal erythropoiesis, and later in pregnancy to meet the demands of the fetus. Serum ferritin levels temporarily fall to below a level normally regarded as diagnostic of iron deficiency in the non-pregnant patient in approximately one third of pregnant women who are not given supplements (Fenton *et al.*, 1977).

If prophylactic iron is provided during pregnancy the incidence of frank anaemia, as judged by standard haematological criteria, is reduced (Scott *et al.*, 1970). There is still a considerable fall in serum ferritin levels throughout pregnancy, but this is less marked than amongst mothers who receive no iron supplements (Fenton *et al.*, 1977; Van Eijk *et al.*, 1978; Puolakka, 1980).

The crucial question is whether prophylactic iron can reduce fetal and maternal morbidity. A review of 17 controlled trials carried out in Western countries of routine administration of iron during pregnancy (Hemminki and Starfield, 1978) failed to find one in which any significant improvement to the outcome of pregnancy was demonstrated in terms of birth weight, length of gestation or infant or maternal morbidity and mortality. There is also doubt about whether iron prophylaxis improves fetal iron stores. A number of investigators have compared cord blood ferritin levels in babies born to mothers who either have or have not received iron prophylaxis. Whilst some investigators have found a correlation between fetal iron stores and provision of iron prophylaxis (Fenton *et al.*, 1977), others have not (Van Eijk *et al.*, 1978; Puolakka, 1980) and the consensus view at present appears to be that maternal storage iron is not an important factor in determining fetal iron stores, although fetal iron may be reduced if maternal stores are completely absent (Worwood, 1980).

It therefore seems that fetal demands are met without iron prophylaxis unless there is severe maternal iron depletion. But what of the mother? Severe anaemia presents a potential hazard, especially if there is haemorrhage, but there is really little evidence that mild or even moderate degrees of iron deficiency in the mother are either symptomatic (Robbe, 1958) or significant in terms of morbidity (Hemminki and Starfield, 1978). Iron stores are inevitably depleted during pregnancy, but a large amount of iron is returned to the stores from red cells and the uterus after delivery, so that low iron

stores at the end of pregnancy may not be significant either in the short or long term. However, if there is pre-existing iron deficiency at the beginning of pregnancy, there is some risk that stores may become completely absent towards the end of pregnancy.

Folic acid

Folates are vital for numerous metabolic processes and no less for the developing fetus than for the mother. There is evidence that severe lack of folic acid is associated with abruptio placentae and some evidence that it may be associated with early spontaneous abortion (Hibbard, 1964). Willoughby and Jewell (1966) investigated the effect of providing prophylactic folic acid at different doses to pregnant women. They found that serum folate levels were significantly lower in untreated controls or those taking iron alone than in non-pregnant women, but if the pregnant women took at least 300 μg folic acid daily this was sufficient to bring serum folate levels up to the norm for non-pregnant women. They thus concluded that there was an additional requirement of 300 μg folic acid per day during pregnancy. This has been challenged and some take the view that, as with iron, a mild deficiency is normal and physiological (Cooper, 1973).

Controlled trials of folic acid supplements during pregnancy have, however, failed to demonstrate any real benefit to mother or fetus (Fletcher *et al.*, 1971; Fleming *et al.*, 1974; Trigg *et al.*, 1976) in either haematological or obstetric terms, although more recently there has been concern that maternal folate depletion may cause folate deficiency in premature babies.

Neural tube defects

For some time there has been interest in the possibility that folic acid deficiency may be a causal factor in malformations—underlined by the fact that folic acid antagonists such as aminopterin cause fetal malformations. Hibbard (1975) found a higher rate of fetal malformations amongst women with low red cell folate levels, although others have failed to find such an association (Giles, 1966; Scott *et al.*, 1970).

Recently, Laurence and colleagues (1981) published the results of a randomized double-blind trial of folate treatment taken prior to conception by 60 women who had already had one infant affected by a neural tube defect, and compared the recurrence rate with that of 51 women taking placebo treatment. There were four recurrences in the placebo group and two in the treatment group. Neither group complied well with the therapy, but the result showed a significant benefit from prophylactic folic acid. This trial was small, and Laurence accepts the need for a larger multi-centre trial to confirm this finding. Smithells and colleagues (1980) carried out a similar multi-centre trial comparing pre-conceptional multivitamin supplementation with pla-

cebo, which also appeared to show benefit from vitamin prophylaxis, but this trial has been criticized because an excess of treated cases came from low-risk areas, and an excess of controls from high-risk areas (Stone, 1980). So again, the conclusion is not clear, and as yet there does not seem to be convincing evidence that either folate or multivitamin supplementation should be given routinely to prevent neural tube defects.

A prescribing policy?

Having considered the evidence for the effectiveness of routine prophylactic iron and folate supplements, one must conclude that, although severe iron and folate deficiency are of importance, there remains little reason to continue with ritual prescribing of iron and folate combinations. At least 30 per cent of patients prescribed these preparations do not take them anyway (Bonnar *et al.*, 1969), and the cost is considerable. The number of children poisoning themselves with prescribed medications is fortunately decreasing with the advent of child-resistant containers (Sibert *et al.*, 1979), but accidental overdose with iron carries a considerable threat to life and is an ever-present danger if it is prescribed widely.

It is also important to consider other implications of continuing a policy of blanket prescribing of iron and folate. So far as the patient and the community is concerned, such a policy diverts attention away from the real problem, which is maintaining adequate basic nutrition. The doctor may also be lulled into a false sense of security; prescription of prophylactic haematinics does not absolve him or her from the duty to assess the patient thoroughly, to give individual advice about appropriate diet and to check the patient's haemoglobin at least by the end of the first trimester, towards the end of the second trimester and at around 32-34 weeks' gestation. If anaemia is found, appropriate investigation and treatment should be instituted.

A policy of selective and specific prophylactic prescribing can be followed solely for those patients known to be at risk of developing severely depleted stores of iron or folate. Iron should be prescribed (as the cheapest preparation—ferrous sulphate) if the haemoglobin falls below 12 g/100 ml, or if there is a history of previous anaemia, and for the patient of high parity or with a multiple pregnancy. If a brief dietary history suggests low iron intake, which is more likely if the patient is of social class IV or V, then iron supplements may also be recommended. There is no need to begin supplements until the second trimester, when nausea will have settled.

Similarly, folic acid may be prescribed selectively for those patients with a history of folate deficiency or malabsorption, of high parity or if there is a multiple pregnancy. A combined iron and folate preparation would be acceptable in these circumstances, but one with an appropriate amount of both elemental iron (at least 80 mg) and folate (300-500 μg) (WHO, 1972).

It has also been suggested that vitamin D be prescribed for Asians (Brooke *et al.*, 1980), but the real problem here again probably relates to dietary education rather than provision of supplements.

The easy answer to nutritional problems is to provide supplements as medicines, or to fortify food. The correct approach must surely lie in teaching sound nutrition in schools, to parents and to patients, and in influencing national policies so that prospective parents and expectant mothers are more likely to eat a nutritionally sound diet.

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People with arthritis

THE International Year of Disabled Persons is an appropriate time to take stock of an important sphere of activity of the medical and allied health professions. A part of this area comprises 'rheumatism', to which arthritis, in its varied forms, contributes a formidable burden in terms of numbers of people afflicted, chronicity and high use of services. Two recent reports issued by the Arthritis and Rheumatism Council (ARC) (1981a, 1981b) survey the scene, examining on the one hand services available to patients, and on the other the present state of teaching about rheumatology in UK medical schools.

In one sense both reports make gloomy reading, since they highlight the many deficiencies apparent in both

spheres. On the service front, an overall shortage of consultant services is compounded by a patchy regional distribution of specialists; waiting lists are unacceptably large and prolonged; and all this is compounded by a rising tide of patient demand and, possibly, need. On the educational front, the story is one of insufficient curriculum time, and the failure of medical schools to capitalize on existing opportunities and to accord rheumatology an appropriately high academic status. These failures are seen against a need to move undergraduate medical education away from its present preoccupation with crisis intervention and acute disease. This picture is familiar to those concerned with preparation and training for general practice. Indeed, so close are the paral-