

# Iron and folate supplements during pregnancy: supplementing everyone treats those at risk and is cost effective

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Prescribing prophylactic supplements of iron and folic acid to pregnant women has been widespread practice in the United Kingdom since the late 1950s. In recent years, however, this policy has been criticised<sup>1,2</sup> and is no longer considered to be necessary by some obstetricians and general practitioners.

## Iron and folate depletion in pregnancy

Most women are unable to meet the demands of expanding red cell mass and fetal growth in pregnancy without depleting their stores of iron,<sup>3,5</sup> and diet, even in developed countries, contains insufficient folic acid to prevent a reduction in tissue folate concentrations.<sup>6,7</sup> As a result some pregnant women become anaemic. Supplements of 30-100 mg elemental iron and 100-300 µg folic acid daily are effective in maintaining iron stores and folate state and in raising the haemoglobin concentration in healthy pregnant women.<sup>8-11</sup> The incidence of anaemia has declined in Britain since the second world war, but the widespread use of iron and folate supplements has probably contributed; withdrawing routine prophylaxis would risk reversal of this trend.<sup>12</sup>

Although few would dispute the efficacy of supplements in preventing the depletion of iron and folate and, indeed, in raising the haemoglobin concentration, the beliefs now exist that the apparent deficits are not harmful and that the average diet in the United Kingdom in the 1980s is sufficient in itself to ensure nutritional wellbeing of mother and fetus.<sup>12</sup> Indeed, many trials in developed countries have shown no benefit of iron and folate prophylaxis in relation to the outcome of pregnancy. In a widely quoted review only three out of 17 studies showed any benefit to mothers or infants from iron and vitamin supplements.<sup>13</sup> Many of the trials, however, had major drawbacks. Some excluded patients with a relevant outcome of pregnancy—for example, anaemia, premature delivery, antepartum haemorrhage. In others groups of patients were not comparable, and many included small numbers of patients. Caution should therefore be exercised in drawing firm conclusions from such data.

## Risks of anaemia

Even if the statistical outcome of these trials is accepted, anaemia remains a potential danger to individual women during pregnancy. Severe anaemia is obviously undesirable, but the effects of small decreases in haemoglobin are controversial. Although a physiological decrease in haematocrit occurs due to a disproportionate expansion of plasma volume in mid-pregnancy, according to the World Health Organisation's criteria, anaemia is present in pregnancy when the haemoglobin concentration is less than 110 g/l.<sup>14</sup> Even a modest decline below this value may have deleterious effects—for example, a patient with anaemia is less able to withstand haemorrhage at delivery or during surgical intervention.<sup>15</sup> Studies in Britain and the United States have shown that fetal death, low birth weight, and prematurity are more common in women with haemoglobin concentrations of less than 110 g/l,<sup>16-18</sup> and low oestriol values, which may indicate placental insufficiency, have also been found in the late stages of pregnancy when the haemoglobin concentration is less than 110 g/l.<sup>19</sup>

Although all of these reports show an association rather than a relation of cause and effect, their findings cannot be discounted.

Although the incidence of anaemia has fallen in the postwar years, it is not as uncommon as is sometimes assumed, especially in some areas of the United Kingdom. In 1967, 10.0% of pregnant women in Glasgow who were not given supplements had haemoglobin concentrations less than 10 g/l,<sup>10</sup> and in 1973 in the same city the incidence of megaloblastic anaemia was 12.2%.<sup>12</sup>

## Advantages and disadvantages of supplements

The main benefit of widespread prescription of iron and folate prophylaxis is the prevention of anaemia during pregnancy. Additional benefits, however, exist. Iron deficiency has non-haematological effects such as impaired resistance to infection.<sup>20</sup> Contrary to some reports, continuing iron deficiency as late as six months postpartum has been found,<sup>4</sup> and, although neonatal iron deficiency is rare, some evidence suggests that maternal iron deficiency could have a bearing on the iron state of the infant in the first year of life.<sup>3,21</sup> As far as folate is concerned several reports suggest an association between folate deficiency and fetal malformations, premature delivery, placental abruption, and abortion<sup>22,23</sup>; but others disagree.<sup>24</sup> More recently attention has been drawn to a possible role for periconceptional folate deficiency in neural tube defects,<sup>25</sup> and, though further evidence is required, this is a factor which must be borne in mind should withdrawal of routine folate supplements in pregnancy be considered.

Potential side effects and safety of iron and vitamin preparations are important. Poor compliance is generally not related to gastrointestinal side effects, which are uncommon at the dose of elemental iron usually prescribed.<sup>26</sup> Early suggestions of possible teratogenicity of iron<sup>27</sup> have been refuted in a prospective study showing that the use of iron and vitamin preparations was associated with a lower incidence of an unfavourable outcome of pregnancy.<sup>28</sup> Overloading with iron is improbable in healthy women of child-bearing age, and neurological complications from giving folate are unlikely as vitamin B<sub>12</sub> deficiency usually results in infertility.<sup>29</sup> The single greatest hazard is the risk of accidental overdosage of iron in young children. Warnings to mothers and using containers that are child proof will reduce this risk.

Concern that prescribing supplements may divert attention from dietary measures has been expressed,<sup>2,13</sup> but this need not be the case if supplements are considered to be complementary to a balanced diet rather than a substitute. Furthermore, those most at risk of deficiency may be those least amenable to dietary improvement owing to socioeconomic circumstances.

## Alternative strategies

It is worth while considering the alternatives to routine iron and folate prophylaxis. Selective prophylaxis has been suggested for women considered to be at risk on clinical and epidemiological grounds<sup>1,2</sup> or because of laboratory results.<sup>5,30</sup> This may prove

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practicable in some areas of the country, but some women may be misclassified and in other areas most pregnant women may in any case meet the criteria for prophylaxis, as in one Norwegian study.<sup>5</sup> Red cell variables are poor indicators of haematinic deficiency in pregnancy because of the physiological increase in mean cell volume and because iron and folate deficiency are often concomitant.<sup>8,29</sup> The single most reliable predictor of iron deficiency anaemia is serum ferritin concentration, and its measurement in early pregnancy to select patients for prophylaxis has been suggested<sup>5,30</sup> and may be useful. No similar simple predictor of megaloblastic anaemia exists.<sup>29</sup> Values of red cell folate overlap in pregnant women who develop megaloblastic anaemia and those who are healthy. Significant iron deficiency in pregnancy can therefore be reliably predicted in the laboratory whereas significant folate deficiency cannot.

Furthermore, an efficient screening programme for all pregnant women presents logistic difficulties of laboratory workload, follow up of patients, and cost. Those at greatest risk are poor attenders at antenatal clinics; in one survey 29% of women with megaloblastic anaemia diagnosed antenatally were defaulters.<sup>12</sup> The cost for each patient of a full set of haematinic assays on one occasion is at least as much as that of providing one of the cheaper combined iron and folate preparations throughout pregnancy (box).

### Conclusions

The best policy for preventing nutritional anaemias may vary from one area of the country to another, but there is as yet no practical and less costly alternative that would meet the needs of all groups of women. Routine supplementation, however, does not replace the need for dietary advice and haematological monitoring.

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### Comparative costs of prophylactic haematinic treatment during pregnancy

● Iron and folate supplements from 12 weeks' gestation (cheapest preparation)	£3.57
● Assay of serum and red cell folate concentrations (each test)	£3.30
● Assay of serum ferritin concentration (each test)	£2.50

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### WORDS

● SH-SH-SH I have previously drawn attention to the desirability of pronouncing correctly the names of our foreign colleagues.<sup>1</sup> This is important as a matter of courtesy when, for example, introducing a visiting lecturer to a waiting audience. Everyone knows that the phonetic values of the Latin alphabet vary between languages. Consequently the spelling of a foreign name may give misleading clues to its pronunciation. It is hard enough for us; but where British names are concerned it is even worse for the foreigner in our midst, as the sound of a British name often bears little relation to the spelling, even according to such rules as exist.

Many readers will remember Dag Hammarskjöld, Swedish politician, whose name was pronounced "Hammershølt" on British radio and television. Readers will also be familiar with

the name of Torsten Sjögren (pronounced "Shögren") from his eponymous syndrome. Less well known are the Swedish ophthalmologist Henrik Sjögnér and the neurosurgeon Sjöqvist. The initial "sh" sound ( in the phonetic alphabet) is represented in Swedish by the following: sch, sj, sk (when followed by e or i), skj, and stj. Other manifestations of this sound exist within and between words, as well as in imported English, French, and German words.

We may now contemplate the ski. In Norwegian *ski* is pronounced "shee"; likewise the German *Schi* ("shee"), and Swedish *skida* ("sheeda"). The *Oxford English Dictionary* in 1911 gave the English pronunciation as "shee" and "skee," in that order. Despite the assertion of etymologists that the word derives from Old Norse *skið*, a billet of cleft wood, I cannot

altogether dismiss the feeling that "shee" is echoic (onomatopoeic) of the swishing sound of skis moving on snow.

Skiing has been a normal mode of locomotion since the Stone Age in countries where winters are prolonged and snowladen. It has now become additionally a sport. Neuromuscular coordinations that are acquired lastingly in childhood are less easily learnt in middle age. In two seasons several of my colleagues came to this realisation: A, B, and C had fractured tib and fib; D fractured his humerus; this was complicated by radial nerve palsy; E tore internal ligaments of the knee with some lasting disability; and F "broke both knees" (no details). So, do be careful. — B J FREEDMAN

1 Freedman BJ. *Just a word, doctor.* Oxford: Oxford University Press, 1987:64.