

Issue 70

In a nutshell

Iron deficiency is a particular risk for vegetarians, especially women.

Although the results from these new studies are reassuring in some respects, it is still better for clinicians to check their vegetarian patients' iron status, rather than assume that the diet will provide enough iron in each case.

Vegetarians and iron

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NUTRITION RESEARCH REVIEW

Study one: existing vegetarians

Ferritin status is lower in vegetarian women compared with omnivores, but this does not produce a higher incidence of iron deficiency, according to a new Australian study.

Subjects: 50 reproductive aged vegetarian women (recruited from posters and newspaper notices) and 24 age-matched omnivorous control women.

Method: Twelve day weighed dietary record as well as biochemical assessment.

Results: The vegetarian women did not have significant differences in the total iron intake compared with omnivore controls, but had much lower haem iron, and higher vitamin C intakes. There was a significantly lower mean serum ferritin level in the vegetarians, but not a higher proportion of women falling below the normal range (i.e. < 12µg/L).

Reference: *Am J Clin Nutr* 1999;70:353-358

Table 1: vegetarian vs omnivore women			
	Omnivore	Vegetarian	Signif.
Iron intake (SD)	9.9 (± 2.9)	10.7 (± 4.4)	NS
Vit.C	111.1 (± 85.3)	149.9 (± 77.1)	p < 0.01
Serum ferritin	45.5 (± 42.5)	25.0 (±16.2)	p < 0.025

Study two: short term vegetarian diet

Vegetarian diet may result in increased efficiency of iron absorption as a partial adaptation to lower iron bioavailability, according to authors of a recent American feeding study.

Subjects: 21 women of varying initial iron status.

Method: Crossover study in which the women consumed lactoovo-vegetarian and non-vegetarian weighed diets for eight weeks each. Iron absorption was measured using radioactive iron and whole body counting.

Results: Vegetarian diet was associated with significantly less non-haem iron absorption than non-vegetarian diet (1.1% vs 3.8%, p < 0.01). There were no significant differences in red cell indices or serum ferritin.

The vegetarian diet was associated with significantly less faecal ferritin excretion than the non-vegetarian diet (1.1 vs 6.0 µg/d, p < 0.01).

Reference: *Am J Clin Nutr* 1999;69:831-2

Study three: Seventh Day Adventists (SDA)

Iron status in SDA vegetarians is satisfactory, according to New Zealand results published last year.

Subjects: 24 vegetarians and 23 non-vegetarian SDA subjects of both genders.

Method: Serum ferritin and haemoglobin were measured.

Results: There were no significant differences, and both groups had satisfactory iron and vitamin B12 status.

Reference: *NZ Med J* 1998;111:91-4

Study four: Vegetarians in the developing world

There is a high level of iron deficiency in vegetarians in Thailand, along with vitamin B12 deficiency.

Researchers from Rangsit University investigated 179 vegetarians and 58 control subjects. There was a 19% prevalence of iron deficiency. The vegetarians had lower haemoglobin, haematocrit, MCH, serum ferritin and serum vitamin B12 levels in vegetarian compared to control subjects, as well as lower white cell and neutrophil counts ($p < 0.05$). Vitamin B12 deficiency was seen in 40% of the vegetarian subjects.

Reference: *J Med Assoc Thai* 1999;82:304-11

Comments

The first three studies have found reassuring results in terms of the iron status of vegetarians, particularly vegetarian women.

Whilst intake of high bioavailability haem iron is clearly less in vegetarians, there are several mechanisms that can compensate. These include higher vitamin C intake and a compensatory physiological mechanism related to iron excretion.

However, the key to understanding the relevance of these results is in the sample selection. The first three studies were all based on small numbers of volunteer subjects from apparently well-nourished urban environments. Although not stated, it is possible that many of these subjects were well educated, such as those living in or around the university environment. In the case of Seventh Day Adventists, for example, it is well established that the level of nutritional motivation and knowledge is quite high.

The same rosy results may not have been seen in a less optimal sample group. For example, the editor

of this Update has himself demonstrated in a group of less nutritionally educated a significantly higher prevalence of iron deficiency in both female and male 'New' vegetarians, compared with control omnivores¹.

The situation is even more complex in the developing world, where vegetarian diet by religious choice (e.g. in Buddhist countries) often coexists with semi-vegetarian diet from economic necessity. Typically a high prevalence of iron deficiency coexists with a more general overall dietary deficiency. In some vegetarian populations there are much higher prevalence of B12 deficiency than seen in better nourished Western vegetarians. This is highlighted in the Thai study.

So perhaps the message is: check rather than assume that the diet of a vegetarian is satisfactory. Iron deficiency is a risk, but by no means an inevitable consequence of vegetarianism.

References:

1. *Am J Clin Nutr* 1987;45:7859

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