Development of a computer aided method for estimating bioavailable dietary iron from weighed food records

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Most of the work examining the relationship between iron status and iron intake suggests that iron status is more closely related to haem iron intake than to either total iron intake or non-haem iron intake. This is due to the higher bioavailability of haem iron (11-22%) compared with non-haem iron (1-7%). However, the relationship between calculated bioavailable iron intake (BDI) and iron status has not been examined. Monsen (1978), developed a method for the estimation of BDI from a single meal (1). However, a daily BDI is required to examine the relationship between bioavailable iron intake and iron status. The complicated and tedious nature of the calculations involved is the most likely cause for no such investigations. A computer aided method for estimating BDI from weighed food records has been developed.

The nutrient database was modified to calculate haem and non-haem iron based on Rangan (2) and to allow nutrient calculations per meal. The data were exported to Excel 97 and a program written to calculate average daily BDI intake, using the Monsen factors for enhancers of absorption.

Dietary data from 20 premenopausal female subjects enrolled in an iron deficiency intervention study were examined. There were no significant differences for any iron intake parameters between the iron replete and iron deficient groups, although the iron replete subjects showed less variation in dietary intake (Table). There was a positive linear relationship (r=0.75) between BDI intake and serum ferritin for the iron replete subjects but not for the iron deficient subjects.

	Iron replete	Iron deficient
n	7	13
Serum ferritin ug/L	60.3 (42.6)	9.25 (2.57)
Total iron mg	11.9 (2.5)	12.5 (5.4)
Haem iron mg	1.25 (0.41)	1.17 (0.81)
Non-haem iron mg	10.7 (2.3)	11.5 (4.8)
Bioavailable iron mg	0.65 (0.14)	0.67 (0.34)
% Total	5.47	5.37

The sample size is currently too small to draw any conclusions, and data have not yet been adjusted for age, parity, menstrual blood loss, exercise, blood donation, contraception or vitamin and mineral supplement use. However, the method will enable easier estimation of BDI for investigation of relationships between BDI intake and iron status.

1. Monsen ER, Hallberg L, Layrisse M, Hegsted DM, Cook JD, Mertz W, Finch CA. Estimation of available dietary iron. Am J Clin Nutr 1978; 31: 134-41.
2. Rangan A, Blight G, Binns C. Haem iron content in Australian meats and fish. Proc Nutr Soc Aus 1996; 20: 210.