

Concurrent Session 13: Trace elements II

Efficacy and side effects of iron supplements for the correction of anaemia in pregnant women: a comparison of high dose vs. low dose iron

SJ Zhou, RA Gibson, M Makrides

Child Health Research Institute, Children Youth and Women's Health Service and University of Adelaide, SA 5006

Background – Anaemia is relatively common in pregnancy and the most common cause is iron deficiency. Despite lack of evidence on the most effective way to treat anaemia in pregnancy, it is often treated with high doses iron that may cause gastrointestinal side effects, interfere with mineral absorption and cause haemoconcentration. Both severe anaemia and haemoconcentration have been linked with adverse pregnancy outcomes.

Objective - To compare the efficacy and side effects of low dose vs. high dose iron supplements in treating anaemia in pregnant women.

Design – Double blinded randomised dose response trial. Eligible pregnant women with anaemia (haemoglobin <110g/l) at the mid-pregnancy routine blood test were randomly allocated to receive either 20mg, 40mg or 80mg of iron daily for 8 weeks. Iron status of the women was assessed at the end of treatment. Gastrointestinal side effects were assessed every 2 weeks. Information on pregnancy outcomes and pregnancy complications were collected from medical records.

Outcomes – A total of 180 women were enrolled and 179 completed the study. At the end of treatment there was a clear dose response of increasing Hb concentration with iron dose (111 ± 13 g/L at 20mg/day, 114 ± 11 g/L at 40 mg/day, 118 ± 13 g/L at 80mg/day, $P=0.015$). However, the incidence of moderate anaemia (Hb<100g/L) or outcome of pregnancy did not differ between groups. Gastrointestinal side effects (including nausea, stomach pain and vomiting) also increased with iron dose ($P<0.05$). Similarly, there was a tendency for more women to have haemoconcentration, defined as Hb>130g/L, with increasing iron dose (4%, 7%, 13%, $P=0.175$).

Conclusions – Although high dose iron supplements are more effective in increasing Hb levels in pregnancy, they are associated with more gastrointestinal side effects and may also be associated with a higher risk of haemoconcentration. Further research is needed to determine the optimal levels of Hb in pregnancy and the most effective and safe dose of iron to treat anaemia in pregnancy.

Iron stores diminish over time in 12-20 month old New Zealand children

EA Szymlek-Gay¹, A-LM Heath¹, EL Ferguson¹, AR Gray², RS Gibson¹

¹*Department of Human Nutrition, University of Otago, PO Box 56, Dunedin, New Zealand*

²*Department of Preventive and Social Medicine, University of Otago, PO Box 56, Dunedin, New Zealand*

Background – Recent cross-sectional research suggests that iron stores diminish with age in the first two years of life.

Objectives – To determine the dynamics of serum ferritin (SF) concentration over a five month period in a sample of healthy 12-20 month old New Zealand (NZ) children.

Design – In a 20-week randomised placebo-controlled trial 225 toddlers were assigned to one of three groups including a placebo group (n=90) in which the toddlers' regular milk was replaced with unfortified (<0.1 mg Fe/100 mL) cow's milk. Three-day weighed dietary intakes were recorded. Non-fasting venipuncture blood samples and anthropometric measures were collected at baseline and 20 weeks. Suboptimal iron status was: "depleted iron stores", SF ≤ 10 μ g/L; "iron deficiency" (ID), haemoglobin (Hb) ≥ 110 g/L and two or more abnormal values for SF, mean corpuscular volume (≤ 73 fL) and zinc protoporphyrin (≥ 70 μ mol/mol haem); or "iron deficiency anaemia" (IDA), Hb <110 g/L and ID.

Outcomes – At baseline the children (n=71) were predominantly boys (58%), and had a mean (SD) age of 16.6 (2.7) months. The mean (SD) intake of dietary iron was 5.6 (2.7) mg/d and 28.8% (95% CI 18.3 to 39.4) had iron intakes below the Australian & NZ EAR for iron (4 mg/d). The prevalence (95%CI) of suboptimal iron status increased from 13.2% (6.2 to 23.6) at baseline to 17.6% (9.5 to 28.8) at 20 weeks. Mean SF concentration (95%CI) declined from 22.8 (19.9 to 26.0) μ g/L to 18.6 (16.1 to 21.4) μ g/L over 20-weeks ($P=0.0359$). There was no change in Hb concentration ($P=0.1968$). Faster growth in length was associated with lower SF concentration ($P=0.0004$) but not Hb concentration ($P=0.3779$). Younger girls had lower Hb concentration than boys, and older girls had higher Hb than boys ($P=0.0177$).

Conclusions – Iron stores decreased over 20 weeks among healthy 12-20 month old NZ children who followed typical NZ toddler diets. Faster growth in length appeared to have contributed to diminishing iron stores. Dietary intervention strategies aiming to improve iron status of NZ toddlers should be assessed.