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

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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 µg/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 µmol/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) µg/L to 18.6 (16.1 to 21.4) µg/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.