

Efficacy of iron-fortified whole maize flour on iron status of school children in Kenya:

Abstract:

Sodium iron edetic acid (NaFeEDTA) might be a more bioavailable source of iron than electrolytic iron, when added to maize flour. We aimed to assess the effect, on children's iron status, of consumption of whole maize flour fortified with iron as NaFeEDTA or electrolytic iron. 516 children, aged 3-8 years, from four schools in Marafa, Kenya, were randomly assigned to four groups. All were given the same amount of porridge five times a week. The porridge for one group was made from unfortified whole maize flour; for the other three groups it was fortified with either high-dose NaFeEDTA (56 mg/kg), low-dose NaFeEDTA (28 mg/kg), or electrolytic iron (56 mg/kg). Concentrations of haemoglobin, plasma ferritin, and transferrin receptor were analysed in samples taken at baseline and at the end of the 5-month intervention. The primary outcome was iron-deficiency anaemia. We analysed data on an intention-to-treat basis. This trial is registered with ClinicalTrials.gov, number NCT00386074. The prevalence of iron-deficiency anaemia in children given unfortified flour was 10%. Compared with placebo, the prevalence of iron-deficiency anaemia in children given flour fortified with high-dose NaFeEDTA, low-dose NaFeEDTA, and electrolytic iron changed by -89% (95% CI -97% to -49%), -48% (-77% to 20%), and 59% (-18% to 209%), respectively. Consumption of high-dose NaFeEDTA improved all measured iron-status indicators. Low-dose NaFeEDTA decreased the prevalence of iron deficiency but did not noticeably change the prevalence of anaemia. Electrolytic iron did not improve any of these iron-status indicators. Children who were iron-deficient at baseline benefited more from high-dose and low-dose NaFeEDTA than those with sufficient iron at baseline. Consumption of whole maize flour fortified with NaFeEDTA caused modest, dose-dependent improvements in children's iron status. Fortification with electrolytic iron did not improve their iron status. Therefore, in high-phytate flours, NaFeEDTA is more suitable than electrolytic iron for supplementation of iron in the diet.