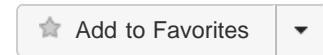


[Sign in to NCBI](#)

PubMed

[Advanced](#)[Search](#)[Help](#)[Abstract](#) [Send to:](#) [Full text links](#)[Save items](#)[Cited by 4 systematic reviews](#)[Review Folic acid](#)

hrane Database Syst Rev. 2013]

[Review Daily oral iron](#)

hrane Database Syst Rev. 2012]

[Review Multiple-micronutrient](#)

hrane Database Syst Rev. 2012]

[See all...](#)[Related citations in PubMed](#)[Preschool micronutrient](#)

Arch Pediatr Adolesc Med. 2012]

[Preschool iron-folic acid and zinc supplementat](#)

[J Nutr. 2011]

[Antenatal supplementation with micronutri](#)

[Am J Clin Nutr. 2006]

[Review Micronutrient](#)

hrane Database Syst Rev. 2010]

[Review Folic acid with or](#)

hrane Database Syst Rev. 2003]

[See reviews...](#)[See all...](#)[Cited by 19 PubMed Central articles](#)[Effect of antenatal multiple micrc](#)

[Lancet Glob Health. 2014]

[Review Iron deficiency and](#)

[Neuropsychiatr Dis Treat. 2014]

[Preventive effects of folic acid supplementati](#)

[PLoS One. 2014]

[See all...](#)[JAMA. 2010 Dec 22;304\(24\):2716-23. doi: 10.1001/jama.2010.1861.](#)

Prenatal micronutrient supplementation and intellectual and motor function in early school-aged children in Nepal.

[Christian P¹](#), [Murray-Kob LE](#), [Khatry SK](#), [Katz J](#), [Schaefer BA](#), [Cole PM](#), [Leclerc SC](#), [Tielsch JM](#).[Author information](#)

Abstract

CONTEXT: Iron and zinc are important for the development of both intellectual and motor skills. Few studies have examined whether iron and zinc supplementation during gestation, a critical period of central nervous system development, affects children's later functioning.

OBJECTIVE: To examine intellectual and motor functioning of children whose mothers received micronutrient supplementation during pregnancy.

DESIGN, SETTING, AND PARTICIPANTS: Cohort follow-up of 676 children aged 7 to 9 years in June 2007-April 2009 who had been born to women in 4 of 5 groups of a community-based, double-blind, randomized controlled trial of prenatal micronutrient supplementation between 1999 and 2001 in rural Nepal. Study children were also in the placebo group of a subsequent preschool iron and zinc supplementation trial.

INTERVENTIONS: Women whose children were followed up had been randomly assigned to receive daily iron/folic acid, iron/folic acid/zinc, or multiple micronutrients containing these plus 11 other micronutrients, all with vitamin A, vs a control group of vitamin A alone from early pregnancy through 3 months postpartum. These children did not receive additional micronutrient supplementation other than biannual vitamin A supplementation.

MAIN OUTCOME MEASURES: Children's intellectual functioning, assessed using the Universal Nonverbal Intelligence Test (UNIT); tests of executive function, including go/no-go, the Stroop test, and backward digit span; and motor function, assessed using the Movement Assessment Battery for Children (MABC) and finger-tapping test.

RESULTS: The difference across outcomes was significant (Bonferroni-adjusted $P < .001$) for iron/folic acid vs control but not for other supplement groups. The mean UNIT T score in the iron/folic acid group was 51.7 (SD, 8.5) and in the control group was 48.2 (SD, 10.2), with an adjusted mean difference of 2.38 (95% confidence interval [CI], 0.06-4.70; $P = .04$). Differences were not significant between the control group and either the iron/folic acid/zinc (0.73; 95% CI, -0.95 to 2.42) or multiple micronutrient (1.00; 95% CI, -0.55 to 2.56) groups. In tests of executive function, scores were better in the iron/folic acid group relative to the control group for the Stroop test (adjusted mean difference in proportion who failed, -0.14; 95% CI, -0.23 to -0.04) and backward digit span (adjusted mean difference, 0.36; 95% CI, 0.01-0.71) but not for the go/no-go test. The MABC score was lower (better) in the iron/folic acid group compared with the control group but not after adjustment for confounders (mean difference, -1.47; 95% CI, -3.06 to 0.12; $P = .07$). Finger-tapping test scores were higher (mean difference, 2.05; 95% CI, 0.87-3.24; $P = .001$) in the iron/folic acid group.

CONCLUSION: Aspects of intellectual functioning including working memory, inhibitory control, and fine motor functioning among offspring were positively associated with prenatal iron/folic acid supplementation in an area where iron deficiency is prevalent.

TRIAL REGISTRATION: clinicaltrials.gov Identifier: [NCT00115271](#).

PMID: 21177506 [PubMed - indexed for MEDLINE]



Publication Types, MeSH Terms, Substances, Secondary Source ID, Grant

[Related information](#)

[Support](#)[LinkOut - more resources](#)**PubMed Commons** [0 comments](#)[PubMed Commons home](#)[How to join PubMed Commons](#)[Related Citations](#)[Clinical Trial Review](#)[MedGen](#)[PubChem Compound \(MeSH Keyword\)](#)[PubChem Substance \(MeSH Keyword\)](#)[Cited in PMC](#)[Cited in Books](#)**Recent Activity**[Turn Off](#) [Clear](#) [Prenatal micronutrient supplementation and PubMed](#) [The evidence linking zinc deficiency with childr PubMed](#) [Cited In for PubMed \(Select 7082716\) \(9\) PubMed](#) [Zinc, the brain and behavior. PubMed](#)[See more...](#)

You are here: NCBI > Literature > PubMed

[Write to the Help Desk](#)**GETTING STARTED**[NCBI Education](#)[NCBI Help Manual](#)[NCBI Handbook](#)[Training & Tutorials](#)**RESOURCES**[Chemicals & Bioassays](#)[Data & Software](#)[DNA & RNA](#)[Domains & Structures](#)[Genes & Expression](#)[Genetics & Medicine](#)[Genomes & Maps](#)[Homology](#)[Literature](#)[Proteins](#)[Sequence Analysis](#)[Taxonomy](#)[Training & Tutorials](#)[Variation](#)**POPULAR**[PubMed](#)[Bookshelf](#)[PubMed Central](#)[PubMed Health](#)[BLAST](#)[Nucleotide](#)[Genome](#)[SNP](#)[Gene](#)[Protein](#)[PubChem](#)**FEATURED**[Genetic Testing Registry](#)[PubMed Health](#)[GenBank](#)[Reference Sequences](#)[Gene Expression Omnibus](#)[Map Viewer](#)[Human Genome](#)[Mouse Genome](#)[Influenza Virus](#)[Primer-BLAST](#)[Sequence Read Archive](#)**NCBI INFORMATION**[About NCBI](#)[Research at NCBI](#)[NCBI News](#)[NCBI FTP Site](#)[NCBI on Facebook](#)[NCBI on Twitter](#)[NCBI on YouTube](#)[Copyright](#) | [Disclaimer](#) | [Privacy](#) | [Browsers](#) | [Accessibility](#) | [Contact](#)National Center for Biotechnology Information, U.S. National Library of Medicine
8600 Rockville Pike, Bethesda MD, 20894 USA