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Persson, L.Å; (2016) Prenatal nutrition, socioenvironmental conditions, and child development. *The Lancet Global health*, 5 (2). e127-e128. ISSN 2214-109X DOI: [https://doi.org/10.1016/S2214-109X\(16\)30356-4](https://doi.org/10.1016/S2214-109X(16)30356-4)

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Prenatal nutrition, socioenvironmental conditions, and child development



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The Millennium Development Goal era was characterised by concerted efforts to improve child survival. This work continues with the Sustainable Development Goals but targets have also been set for preschool children to participate in organised learning and to meet their developmental milestones. The challenge now is that more than four of ten children in low-income and middle-income countries are at risk of impaired cognitive development.¹ Children with stunted growth and living in extreme poverty do poorly at school, have lower incomes as adults, and contribute to the transmission of poverty across generations. Optimum child development needs health, nutrition, security, safety, loving care, and learning. This nurturing environment should be present from before pregnancy and onwards. Nutrition-specific programmes have important roles in these efforts with potential effects not only on foetal and child survival, health and development, but also on adult non-communicable diseases.²

In *The Lancet Global Health*, Prado and coauthors³ have followed-up the large SUMMIT multiple micronutrient trial in Indonesia and analysed the effect of prenatal multiple micronutrient (MMN) supplementation as well as the associations between other early biomedical and socioenvironmental conditions and children's cognition at age 9–12 years. The researchers assessed different aspects of cognitive development: general intellectual ability, declarative memory, procedural memory, executive function, academic achievement, fine motor dexterity, and socioemotional health. The associations were assessed in three different samples from the original pregnancy cohort: a representative sample, a sample of malnourished mothers at recruitment, and a sample of women with anaemia at recruitment. The procedural memory outcome differed between the MMN and the iron and folic acid groups in the random sample, and general intellectual ability in the anaemia sample. These possible effects of prenatal MMN on school age child development were small but a bit more prominent in the anaemia sample. The gathering of evidence of the relative strength of effects for the micronutrients, and of associations with other biomedical and socioenvironmental conditions for

development is commendable. Socioenvironmental conditions such as parental education, socioeconomic status, home environment, and maternal depression seemed to be more important determinants than the biological determinants measured.

Will a foetus that is hungry in the womb be satisfied by multiple micronutrients? The rationale behind the multiple micronutrients as compared with the recommended iron and folate when being developed by WHO, UNICEF and the UN University for trial purposes, was the notion that different micronutrient deficiencies often occur together. But macronutrient and micronutrient deficiencies also occur at the same time and in the same individuals. In the paper by Prado and colleagues, the MMN supplementation had no effect on child development in the subsample of undernourished mothers. This outcome could indicate that for women who also had insufficient intake of macronutrients before or during pregnancy, the prenatal multiple micronutrients had no effect on the child's cognitive development at school age.

Is it safe to give only multiple micronutrients when food intake is insufficient? Earlier reviews have shown that in settings without skilled attendance at delivery, the MMN supplementation might increase the risk of neonatal death by asphyxia.⁴ A study in Nepal documented increased frequency of asphyxia when the mother had been supplemented with MMN.⁵ In Bangladesh, prenatal MMN increased the occurrence of stunting up to 5 years⁶ and decreased the IGF1 levels.⁷ MMN was also associated with unfavourable metabolic markers at 4–5 years.⁷ These unfavourable effects of prenatal MMN supplementation might be context-specific. A systematic review and meta-analysis, published in 2016,⁸ of prenatal MMN trials concluded that there is no evidence that, compared with iron and folic acid supplementation, routine maternal antenatal multiple micronutrient supplementation improves childhood survival, growth, body composition, blood pressure, respiratory, or cognitive outcomes.⁸ In view of this background of both favourable and unfavourable effects, the new evidence presented in the study by Prado and colleagues does not provide enough weight

for a policy change from prenatal iron and folate to MMN supplementation.

The new UN Global Strategy for Women's, Children's and Adolescents' Health 2016–30⁹ emphasises that all women, children, and adolescents should have equal opportunities to thrive and calls for a new set of global research priorities.¹⁰ We need to enhance interventions and improve their impact. We need more follow-up studies of early life interventions, such as the study by Prado and colleague. The Sustainable Development Goals urge families, societies, and global development actors to engage in nurturing care and in the provision of learning opportunities.¹¹ These efforts should be broad and include health, nutrition, education, and child protection. The interventions ought to be provided across the life cycle. National and global programmes are required to meet this challenge. Substantial investments in child development are the foundation for sustainable development in the years to come.¹²

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I declare no competing interests.

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