

Pregnancy vitamin D supplementation leads to greater offspring bone mineral density at age 4 years: findings from the MAVIDOS trial

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In the multi-centre MAVIDOS trial, pregnancy vitamin D supplementation had a beneficial effect on neonatal bone mass amongst winter-born babies but not in other seasons⁽¹⁾. We aimed to assess whether this effect on bone mineralisation is sustained into later childhood, with bone indices assessed at 4 years old in the Southampton participants. Demonstrating persistence of this effect into childhood would increase confidence in a long-term benefit of this intervention for life-long bone health.

In Southampton, Oxford and Sheffield, in a double-blind design, 1123 pregnant women with a baseline 25-hydroxyvitamin D level 25–100nmol/l were randomised to 1000 IU/day cholecalciferol or matched placebo from 14 weeks' gestation to delivery. At age 4 years (Southampton participants only, n = 723 births), offspring assessments included anthropometry and whole-body dual-energy x-ray absorptiometry (DXA) [Hologic Horizon, yielding whole body less head (WBLH) bone mineral content (BMC), areal bone mineral density (aBMD), bone area (BA) and lean mass (LM)]. T-tests or Mann-Whitney U tests were used to compare bone DXA outcomes by maternal randomisation group. Linear regression was used to estimate the mean difference (represented by β) in outcomes between the two randomisation arms, adjusted for sex, and age at DXA. Outcomes were standardised to a standard deviation scale, for ease of comparison. Full ethics and MHRA approvals were granted. Trial registration: ISRCTN82927713, registered 11/04/2008.

564/723 (78.0%) children attended the 4-year visit; of whom 452 had a useable DXA with minimal movement artefact. Maternal pregnancy vitamin D supplementation led to greater offspring indices of bone mass compared with placebo, irrespective of season, for example WBLH aBMD at age 4 years, [supplemented group, 0.477 (95% CI: 0.472,0.481) g/cm²; placebo group 0.470 (0.466,0.475) g/cm²; $\beta=0.18$ (0.00,0.35) SD p=0.047], and a trend towards associated greater LM [supplemented group, 9.25 (9.08,9.42) kg; placebo group 9.01 (8.83,9.18) kg; $\beta=0.15$ (-0.02, 0.31) SD p=0.081]. No effect was observed on fat mass. There was evidence of a larger effect of the intervention in the context of lower childhood calcium intake and lower physical activity. There was no difference in child weight, height or BMI between maternal randomisation groups.

This new evidence from a large placebo-controlled, double-blind randomised trial suggests that maternal pregnancy vitamin D supplementation leads to sustained improvement in offspring bone and muscle mass, informing public health approaches for the prevention of fractures.

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Reference

1. Cooper C, Harvey NC, Bishop N, et al. (2016) *Lancet Diabetes Endocrinol* 4(5), 393–402.