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Impact of intrauterine and postnatal nutritional determinants on blood pressure in early childhood

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Objectives — To assess maternal nutritional determinants during pregnancy and child postnatal dietary intake, growth and adiposity on blood pressure programming at the age of four years.

Methods — A cohort of 109 mother-child pairs was followed from early pregnancy until the children were four years old. Maternal clinical characteristics and dietary intake, recorded in three-day food diaries, were assessed at each trimester of pregnancy. Children's anthropometrics were repeatedly measured, and their dietary intake and blood pressure, using an automated oscillometric DINAMAP ProCare 100, were evaluated at the age of four years.

Results — Child systolic blood pressure (BP) was positively associated with maternal carbohydrate intake during pregnancy (p=0.029). The systolic BP was also higher in children exposed to the highest and lowest tertiles of maternal dietary fat intake(p=0.004) and weight gain (p=0.026) during pregnancy, and systolic BP at the 1st trimester(p=0.023), compared to other children. Postnatally, children's dietary fat(p=0.033) and protein intakes(p=0.026), body surface area (p=0.002) and supra-iliac skinfold(p=0.063) were the main factors explaining their systolic BP. The most prominent factors explaining child's diastolic BP were their dietary fiber intake and weight at the age of four. The diastolic BP was lower in children whose fiber intake was in the highest and lowest tertiles, compared to the middle tertile, while weight correlated linearly with diastolic BP (r=0.289, p=0.026).

Conclusions — Maternal and child nutritional determinants at the critical period of vascular development may impact on child blood pressure. Interventions are needed focusing especially on balanced dietary intake in mother and child.