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Sex-specific association of human milk fatty acids and blood pressure in preschool children: results from the Canadian Healthy Infant Longitudinal Development (CHILD) study.

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Background:

Breastfeeding in infancy is favourably associated with cardiovascular health in adulthood; however, little is known about the human milk components that drive this association.

Objective:

We examined the associations of human milk fatty acids and blood pressure in preschool children.

Methods:

In a subset of 954 mother-infant dyads from the CHILD Study, we analyzed milk collected at 3-4 months postpartum and measured relative levels (% total fatty acids) of saturated, monounsaturated, and polyunsaturated fatty acids (PUFA) by gas-liquid chromatography. Blood pressure (BP) was measured at 3 years. Principal components analysis was used to reduce data dimensionality and regression was used to determine associations and test for sex differences, with adjustment for potential confounders including maternal hypertensive disorders and child body mass index.

Results:

Boys and girls had a mean systolic/diastolic BP of 100/59 and 99/58 mmHg, respectively. Among girls only, higher milk C24:1n9 and conjugated linoleic acid levels were associated with higher diastolic BP (both $p<0.05$). Additionally, higher n3-PUFA levels, including C20:5n3 (adjusted beta +1.74 mmHg, 95%CI: 0.47, 3.00 for each SD increase), were associated with higher systolic BP in girls. Accordingly, the third principal component (characterized by high n3-PUFA levels, explaining 12% of total fatty acid variation), was associated with higher systolic BP in girls (+1.16 mmHg, 95%CI 0.18, 2.14). Opposite trends were observed in boys, where the same n3-PUFA component tended to be associated with lower systolic BP (-0.94 mmHg, 95%CI -2.05, 0.16) (p for interaction<0.05). These PUFA effect sizes were comparable to child BMI (+1.21 mmHg per kg/m^2) in the same multivariable model.

Conclusion:

Our results demonstrate sex-specific associations between human milk fatty acids and BP, suggesting opposite influences of n3-PUFA in boys and girls by 3 years of age. Further studies are needed to characterize the biological mechanisms underlying these associations and determine their clinical significance.