**SUPPLEMENTARY MATERIAL**

**Associations of breastfeeding patterns and introduction of solid foods with**

**childhood bone mass: The Generation R Study**

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**Supplementary Table S1**. Crude associations of infant feeding with childhood bone mass (N=4,919).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **BMD (mg/cm2)**β (95% CI) | **BMC (g)**β (95% CI) | **aBMC (g)**β (95% CI) | **BA (cm2)**β (95% CI) |
| **Ever breastfeeding (N=4,919)** |  |  |  |  |
| Never (N=374) | -3.19 (-6.73, 0.35) | -6.23 (-10.56, -1.96) \* | -1.19 (-4.98, 2.61) | -6.15 (-11.50, -0.80) \* |
| Ever (N=4,545) | Reference | Reference | Reference | Reference |
| **Breastfeeding duration (N=3,470)** |  |  |  |
| 0 – 1.9 months (N=976) | 1.37 (-1.42, 4.16) | 0.83 (-2.59, 4.24) | 1.15 (-1.81, 4.12) | -0.40 (-4.65, 3.86) |
| 2 – 3.9 months (N=816) | 3.19 (0.25, 6.12) \* | 2.40 (-1.18, 5.99) | 3.18 (0.05, 6.31) \* | -0.94 (-5.40, 3.52) |
| 4 – 5.9 months (N=458) | 0.30 (-3.29, 3.89) | 0.38 (-3.91, 4.67) | -1.04 (-4.74, 2.66) | 1.72 (-1.04, 4.48) |
| ≥ 6 months (N=1,220) | Reference | Reference | Reference | Reference |
|  *P for trend* | *0.15* | *0.44* | *0.19* | *0.71* |
| **Exclusive breastfeeding for 4 months (N=3,597)** |  |  |  |
| No (N=2,589) | 3.30 (0.88, 5.72) \* | 0.47 (-2.46, 3.40) | 4.44 (1.86, 7.02) \*\* | -4.81 (-8.50, -1.12) \* |
| Yes (N=1,008) | Reference | Reference | Reference | Reference |
| **First introduction of any solids (N=3,631)** |  |  |  |
| < 4 months (N=397) | 3.64 (0.07, 7.21) \* | 3.21 (-1.03, 7.44) | 3.82 (0.01, 7.62) \* | -0.74 (-6.11, 4.64) |
| 4 – 4.9 months (N=2,027) | Reference | Reference | Reference | Reference |
| 5 – 5.9 months (N=705) | -2.16 (-5.00, 0.69) | 1.42 (-2.01, 4.86) | -3.61 (-6.64, -0.58) \* | 6.10 (1.82, 10.38) \* |
| ≥ 6 months (N=502) | 1.75 (-1.55, 5.06) | -3.14 (-7.09, 0.82) | 3.80 (0.30, 7.30) \* | -8.41 (-10.95, -5.88) \*\* |
| *P for trend* | *0.37* | *0.08* | *0.73* | *0.16* |

\*\**P* <0.01 \**P* <0.05.

*BMD: bone mineral density; BMC: bone mineral content; aBMC: area-adjusted bone mineral content; BA: bone area.*

Values are based on multivariable linear regression models and reflect differences and 95% CI in bone outcomes for categories of breastfeeding and introduction of solid foods. Tests for trend were performed by using categories of breastfeeding or introduction of solids as continuous variables in the analyses. Nonexclusive breastfeeding for 4 months includes partial until 4 months, partial thereafter; and partial until 4 months, not thereafter. Exclusive breastfeeding for 4 months includes exclusive until 6 months; exclusive until 4 months, partial thereafter; and exclusive until 4 months, not thereafter.

Models are adjusted for child’s sex, ethnicity, age at visit, height at visit, and fat mass plus lean mass at visit.

**Supplementary Table S2.** Covariate-adjusted associations of infant feeding with childhood bone mass, additionally adjusted for infant vitamin D supplementation (N=4,919)**.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **BMD (mg/cm2)**β (95% CI) | **BMC (g)**β (95% CI) | **aBMC (g)**β (95% CI) | **BA (cm2)**β (95% CI) |
| **Ever breastfeeding (N=4,919)** |  |  |  |  |
| Never (N=374) | -3.50 (-7.40, 0.41) | -7.45 (-12.14, -2.77) \* | -0.93 (-5.15, 3.28)  | -7.91 (-13.80, -2.01) \* |
| Ever (N=4,545) | Reference | Reference | Reference | Reference |
| **Breastfeeding duration (N=3,470)** |  |  |  |
| 0 – 1.9 months (N=976) | 1.85 (-1.42, 5.11) | 1.64 (-2.39, 5.66) | 1.61 (-1.87, 5.09) | 0.04 (-5.06, 5.13) |
| 2 – 3.9 months (N=816) | 2.70 (-0.29, 5.69) | 2.38 (-1.27, 6.03) | 2.54 (-0.65, 5.73) | -0.20 (-4.76, 4.36) |
| 4 – 5.9 months (N=458) | -0.56 (-4.12, 3.01)  | -0.40 (-4.76, 3.96) | -1.98 (-5.78, 1.82) | 1.91 (-3.53, 7.36) |
| ≥ 6 months (N=1,220) | Reference | Reference | Reference | Reference |
|  *P for trend* | *0.19* | *0.44* | *0.22* | *0.73* |
| **Exclusive breastfeeding for 4 months (N=3,597)** |  |  |  |
| No (N=2,589) | 3.28 (0.72, 5.84) \* | 0.75 (-2.38, 3.88) | 4.31 (1.59, 7.04) \* | -4.32 (-8.25, -0.38) \* |
| Yes (N=1,008) | Reference | Reference | Reference | Reference |
| **First introduction of any solids (N=3,631)** |  |  |  |
| < 4 months (N=397) | 4.06 (0.42, 7.71) \* | 3.86 (-0.53, 8.24) | 4.03 (0.15, 7.90) \* | -0.21 (-5.70, 5.28)  |
| 4 – 4.9 months (N=2,027) | Reference | Reference | Reference | Reference |
| 5 – 5.9 months (N=705) | -2.06 (-5.04, 0.93) | 1.23 (-2.35, 4.80) | -3.41 (-6.58, -0.23) \* | 5.62 (1.15, 10.09) \* |
| ≥ 6 months (N=502) | 1.42 (-1.98, 4.83) | -3.68 (-7.77, 0.42) | 3.47 (-0.17, 7.12)  | -8.67 (-13.83, -3.51) \* |
| *P for trend* | *0.31* |  *0.03*  | *0.74* | *0.08* |

\**P* <0.05.

*BMD: bone mineral density; BMC: bone mineral content; aBMC: area-adjusted bone mineral content; BA: bone area*

Values are based on multivariable linear regression models and reflect differences and 95% CI in bone outcomes for categories of breastfeeding and introduction of solid foods. Tests for trend were performed by using categories of breastfeeding or introduction of solids as continuous variables in the analyses. Nonexclusive breastfeeding for 4 months includes partial until 4 months, partial thereafter; and partial until 4 months, not thereafter. Exclusive breastfeeding for 4 months includes exclusive until 6 months; exclusive until 4 months, partial thereafter; and exclusive until 4 months, not thereafter.

Models are adjusted for maternal pre-pregnancy BMI, parity, educational level, smoking during pregnancy, folic acid supplementation use, working status, household income, child’s sex, birth weight Z-score, ethnicity, infant vitamin D supplementation, participation in sports, age at visit, height at visit, and fat mass plus lean mass at visit. Models on ever breastfeeding and breastfeeding duration were additionally adjusted for timing of introduction of solids, and models on timing of introduction of solids were additionally adjusted for breastfeeding duration.

**Supplementary Table S3.** Covariate-adjusted associations of ever breastfeeding with childhood bone mass, stratified by child ethnicity (N=4,919)**.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **BMD (mg/cm2)**β (95% CI) | **BMC (g)**β (95% CI) | **aBMC (g)**β (95% CI) | **BA (cm2)**β (95% CI) |
| **European (N=3,841)** |  |  |  |  |
| Ever breastfeeding  |  |  |  |  |
| Never (N=311) | -6.11 (-10.02, -2.20) \* | -9.39 (-14.13, -4.66) \*\* | -3.73 (-7.94, 0.48) | -6.87 (-12.99, -0.75) \* |
| Ever (N=3,530) | Reference | Reference | Reference | Reference |
| **African and Asian (N=1,078)** |  |  |  |  |
| Ever breastfeeding  |  |  |  |  |
| Never (N=63) | 3.41 (-6.03, 12.85) | -0.95 (-12.26, 10.36) | 4.13 (-6.04, 14.31) | -6.16 (-19.68, 7.35) |
| Ever (N=1,015) | Reference | Reference | Reference | Reference |

\*\**P* <0.01 \**P* <0.05.

*BMD: bone mineral density; BMC: bone mineral content; aBMC: area-adjusted bone mineral content; BA: bone area*

Values are based on multivariable linear regression models and reflect differences and 95% CI in bone outcomes for ever vs. never breastfeeding.

Models are adjusted for maternal pre-pregnancy BMI, parity, educational level, smoking during pregnancy, folic acid supplementation use, working status, household income, child’s sex, birth weight Z-score, timing of introduction of solids, participation in sports, age at visit, height at visit, and fat mass plus lean mass at visit.