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| **Supplemental Table 1.** Multivariate linear associations between maternal plasma choline concentrations (5 µmol/L) and offspring length/height and weight in first 5 years of life. |
|  | SWS |  | GUSTO |
|  |  | Crude |  | Model 1 |  |  | Crude |  | Model 1 |
|  | n | β | 95% CI | p |  | β | 95% CI | p |  | n  | β | 95% CI | p |  | β | 95% CI | p |
| **Length/height (SD)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Birth  | 959 | 0.16 | -0.15, 0.47 | 0.316 |   | 0.15 | -0.15, 0.45 | 0.323 |  | 948 | 0.15 | -0.05, 0.35 | 0.135 |   | 0.13 | -0.08, 0.33 | 0.233 |
| 6 months | 781 | 0.04 | -0.28, 0.36 | 0.807 |   | 0.17 | -0.15, 0.49 | 0.303 |  | 765 | 0.08 | -0.15, 0.32 | 0.480 |  | 0.08 | -0.14, 0.31 | 0.462 |
| 12 months | 732 | -0.20 | -0.45, 0.05 | 0.122 |   | -0.16 | -0.42, 0.09 | 0.209 |  | 722 | 0.05 | -0.14, 0.25 | 0.588 |  | 0.06 | -0.14, 0.25 | 0.560 |
| 2 years | 681 | -0.18 | -0.40, 0.03 | 0.100 |   | -0.14 | -0.35, 0.07 | 0.184 |  | 599 | 0.12 | -0.05, 0.29 | 0.176 |  | 0.16 | -0.02, 0.33 | 0.089 |
| 3 years | 667 | -0.09 | -0.24, 0.06 | 0.228 |   | -0.08 | -0.23, 0.06 | 0.263 |  | 576 | -0.08 | -0.20, 0.04 | 0.200 |  | -0.07 | -0.19, 0.06 | 0.328 |
| 4 years | 662 | 0.07 | -0.12, 0.25 | 0.482 |   | 0.05 | -0.13, 0.23 | 0.576 |  | 529 | 0.05 | -0.04, 0.14 | 0.272 |  | 0.04 | -0.05, 0.14 | 0.363 |
| 5 years  |  |  |  |  |  |  |  |  |  | 529 | 0.00 | -0.08, 0.08 | 0.997 |  | 0.01 | -0.07, 0.10 | 0.785 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Weight (SD)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Birth  | 978 | 0.32 | -0.04, 0.67 | 0.080 |   | 0.27 | -0.08, 0.61 | 0.131 |  | 948 | 0.15 | -0.05, 0.35 | 0.135 |   | 0.13 | -0.08, 0.33 | 0.233 |
| 6 months | 797 | 0.02 | -0.33, 0.37 | 0.894 |   | 0.12 | -0.23, 0.47 | 0.489 |  | 765 | -0.08 | -0.28, 0.11 | 0.398 |  | -0.04 | -0.23, 0.16 | 0.724 |
| 12 months | 760 | 0.01 | -0.17, 0.19 | 0.887 |   | 0.01 | -0.17, 0.20 | 0.873 |  | 722 | 0.07 | -0.04, 0.18 | 0.233 |  | 0.06 | -0.05, 0.17 | 0.261 |
| 2 years | 726 | -0.08 | -0.28, 0.12 | 0.458 |   | -0.06 | -0.26, 0.15 | 0.588 |  | 599 | 0.08 | -0.05, 0.22 | 0.216 |  | 0.09 | -0.05, 0.23 | 0.201 |
| 3 years | 711 | 0.07 | -0.08, 0.23 | 0.358 |   | -0.07 | -0.08, 0.23 | 0.346 |  | 576 | 0.06 | -0.07, 0.18 | 0.375 |  | 0.04 | -0.09, 0.17 | 0.541 |
| 4 years | 705 | 0.10 | -0.14, 0.34 | 0.422 |   | 0.02 | -0.21, 0.26 | 0.839 |  | 529 | 0.05 | -0.06, 0.17 | 0.353 |  | 0.04 | -0.08, 0.16 | 0.491 |
| 5 years |  |  |  |  |  |  |  |  |  | 529 | -0.04 | -0.15, 0.07 | 0.455 |  | -0.03 | -0.13, 0.08 | 0.632 |
| Crude: Adjusted for measurements at previous time points |
| Model 1: Crude model and additionally adjusted for maternal age, education, height, pre-pregnancy BMI, plasma folate and vitamin B12 concentrations, fetal gender, and gestational age. The results from the GUSTO cohort were additionally adjusted for ethnicity. |

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| **Supplemental Table 2.** The association between maternal plasma choline concentrations (5 µmol/L) during pregnancy and offspring abdominal adiposity as assessed by MRI in the GUSTO cohort study |
|  | TAAT (ml) |  | sSAT (ml) |  | dSAT (ml) |  | IAT (ml) |
|  | β  | 95% CI | p |  | β  | 95% CI | p |  | β | 95% CI | p |  | β  | 95% CI | p |
| **Birth (n=307)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Crude | 0.30 | -1.91, 2.51 | 0.792 |  | -0.19 | -7.64, 7.27 | 0.961 |  | 1.44 | -0.48, 3.35 | 0.141 |  | 0.24 | -2.38, 2.86 | 0.858 |
| Adjusted model | 0.80 | -0.97, 2.57 | 0.376 |  | -0.12 | -1.48, 1,24 | 0.866 |  | 0.24 | -0.13, 0.62 | 0.198 |  | 0.11 | -0.37, 0.59 | 0.648 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **4.5 years (n=120)** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Crude | 143.6 | -175.5, 462.8 | 0.378 |  | 69.4 | -87.4, 226.2 | 0.386 |  | 31.6 | -88.2, 151.4 | 0.605 |  | 39.6 | -15.7, 94.8  | 0.160 |
| Adjusted model | 220.3 | -118.1, 558.6 | 0.202 |  | -4.22 | -145.6, 137.2 | 0.953 |  | -17.5 | -127.8, 92.8 | 0.756 |  | 19.6 | -36.7, 75.8 | 0.496 |
| Model 1: Adjusted for maternal age, education, height, pre-pregnancy BMI, plasma folate and vitamin B12 concentrations, fetal sex, gestational age, and ethnicity. |
| TAAT: total abdominal adipose tissue, sSAT: superficial subcutaneous adipose tissue, dSAT: deep subcutaneous adipose tissue, IAT: Internal adipose tissue |

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| **Supplemental Table 3.** Mother and offspring characteristics between total analytical sample minus subsample (n=655) and subsample with data for total body fat (n=290) |
|  | GUSTO (n=955) |
|  | Total sample minus subsampleN=665 | Subsample N=290 | P for difference |
| **Maternal characteristics** |  |  |  |
| Choline (µmol/L) | 9.0 (1.6) | 9.4 (1.6) | 0.002 |
| Age (y) |  30.9 (4.9) | 30.0 (5.6) | 0.012 |
| Height (cm) | 158.3 (5.7) | 157.9 (5.8) | 0.436 |
| Pre-pregnancy BMI (kg/m2) | 22.6 (4.3) | 23.0 (5.1) | 0.125 |
| Pregnancy weight gain (kg)\* | 8.5 (4.6) | 9.0 (5.3) | 0.133 |
| Ethnicity (%) |  |  | 0.170 |
|  Chinese  | 57.7 | 47.2 |  |
|  Malay | 22.7 | 36.2 |  |
|  Indian | 19.6 | 16.6 |  |
| Educational level (%) |  |  | <0.001 |
|  Primary/secondary | 26.9 | 39.7 |  |
|  Postsecondary | 33.6 | 37.2 |  |
|  University | 39.5 | 23.2 |  |
| Gestational diabetes mellitus (%) | 19.2 | 13.0 | 0.023 |
| Plasma folate (nmol/L)  | 35.4 (25.4-45.9)  | 32.0 (18.8-40.9) | <0.001 |
| Plasma vitamin B12 (pg/mL) | 209 (168-256) | 206.5 (165-258) | 0.488 |
| Birth order - first child | 56.2 | 59.3 | 0.378 |
| Physically active during pregnancy (%) | 31.2 | 21.9 | 0.004 |
| Alcohol intake during pregnancy (%) | 2.2 | 2.1 | 0.914 |
| Employed (%) | 86.1 | 82.7 | 0.350 |
| Smoking during pregnancy (%) | 11.2 | 18.0 | 0.005 |
| **Infant characteristics** |  |  |  |
| Sex – male (%) | 52.2 | 52.1 | 0.975 |
| Gestational age (weeks) | 38.7 (1.3) | 38.8 (1.1) | 0.335 |
| Birth weight (SD) | 0.0 (1.0) | 0.1 (1.0) | 0.431 |
| Birth length (SD) | 0.2 (1.0) | -0.2 (1.0) | <0.001 |
| Birth BMI (SD) | -0.4 (1.1) | 0.0 (0.9) | <0.001 |
|  Values are mean (SD), median (25th-75th percentile) or % |
| \*SWS: Weight gain at 34 weeks’ gestation; GUSTO: weight gain at 26 weeks’ gestation |