Supplementary Table S1: Maternal and child’s baseline characteristics of included (n=767) and excluded (n=320) cohort members of the GUSTO study.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Included1(n=767) | Excluded2(n=320) | *P3* |
| Maternal educational level |  |  | 0.290 |
|  *Post-secondary and below* *University and above* | 491 (64.5)270 (35.5) | 212 (67.9)100 (32.1) |  |
| Ethnicity |  |  | 0.878 |
|  *Chinese* *Malay* *Indian* | 433 (56.5)192 (25.0)142 (18.5) | 180 (56.3)84 (26.3)56 (17.5) |  |
| Household monthly income (in SGD) |  |  | 0.276 |
|  *0 – 1999* *2000 – 5999* *≤ 6000* | 109 (15.3)394 (55.2)211 (29.6) | 46 (15.3)162 (54.0)92 (30.7) |  |
| Maternal age at first birth (years) | 31.0 ± 5.2 | 30.3 ± 4.9 | 0.037 |
| Maternal postpartum BMI at 4 years (kg/m2) | 24.6 ± 5.2 | 24.5 ± 4.8 | 0.827 |
| Child sex |  |  | 0.424 |
|  *Boy* *Girl* | 398 (51.9)369 (48.1) | 175 (54.7)145 (45.3) |  |
| Child screen time (in hours per day) |  |  | 0.420 |
|  *< 2 hours per day* *2 – 4 hours per day* *> 4 hours per day* | 291 (42.8)248 (36.5)141 (20.7) | 86 (47.8)57 (31.7)37 (20.6) |  |
| Child outdoor playing (in hours per day) |  |  | 0.553 |
|  *< 2 hours per day* *2 – 4 hours per day* *> 4 hours per day* | 561 (87.2)78 (12.1)4 (0.6) | 145 (89.0)18 (11.0)0 (0.0) |  |

GUSTO, Growing Up in Singapore Towards healthy Outcomes ; BMI, body-mass index
1Missing data for participants: education (n = 6), household monthly income (n = 53), maternal postpartum BMI at 48 months (n = 97), screen time (n = 87), outdoor playing (n = 124 ).
2Missing data for non-participants: education (n = 8), household monthly income (n = 20), maternal postpartum BMI at 48 months (n = 198), screen time (n = 140), outdoor playing (n = 157).

3*p*-value across three ethnic groups were determined with the use of a χ2-analysis (categorical) or or one-factor analysis of variance (continuous). Values were presented as mean ± s.d. for continuous data or n (%) for categorical data.
*p*<0.05 is statistically significant

Supplementary Table S2: Maternal and child’s characteristics according to tertiles of SSB intake at 18 months of age (n=555)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Low intake2 (0-6 ml)2(n=185) | Medium intake28 (18-43 ml)2 (n=185) | High intake138 (96-231ml)2 (n=185) | *P*3 |
| Maternal ethnicity |  |  |  | <0.0001 |
|  *Chinese* *Malay* *Indian* | 130 (70.2)31 (16.8)24 (13.0) | 122 (66.0)45 (24.3)18 (9.7) | 82 (44.3)77 (41.6)26 (14.1) |  |
| Maternal educational level |  |  |  | 0.001 |
|  *Post-secondary and below* *University and above* | 142 (76.8)43 (23.2) | 118 (64.1)66 (34.9) | 89 (48.6)94 (51.4) |  |
| Parity |  |  |  | 0.324 |
|  *Primiparous* *Multiparous* | 91 (49.2)94 (50.8) | 81 (43.8)104 (56.2) | 95 (51.4)90 (48.6) |  |
| Maternal age at first birth (years) | 32.3 ± 4.8 | 31.9 ± 4.9 | 29.9 ± 5.3 | <0.001 |
| Postpartum BMI at 4 years (kg/m2) | 23.5 ± 4.7 | 24.2 ± 5.0 | 25.6 ± 5.7 | 0.001 |
| Child sex |  |  |  | 0.917 |
|  *Boy* *Girl* | 95 (51.4)90 (47.6) | 97 (52.4)88 (57.6) | 93 (50.3)92 (49.7) |  |
| Breastfeeding status |  |  |  | 0.897 |
|  *Never breastfed* *Breastfed for <6 months* *Breastfed for >* 6 months | 6 (3.3)154 (85.1)21 (11.6) | 5 (2.7)158 (85.9)21 (11.4) | 5 (2.8)149 (82.8)26 (14.4) |  |
| \*Early introduction to solids (<16 weeks of age) |  |  |  | 0.399 |
|  *Yes* *No*  |  146(99.3)1 (0.7) | 146 (98.6)2 (1.4) | 133 (100)0 (0) |  |
| Child screen time (hours/day) |  |  |  | 0.109 |
|  *< 2 hours per day* *2 – 4 hours per day* *> 4 hours per day* | 65 (39.4)52 (31.5)48 (29.1) | 77 (47.5)48 (29.6)37 (22.8) | 75 (48.7)53 (34.4)26 (16.9) |  |
| Child outdoor playing (hours/day) |  |  |  | 0.930 |
|  *< 2 hours per day* *2 – 4 hours per day* *> 4 hours per day* | 117 (90.0)12 (9.2)1 (0.8) | 122 (89.7)13 (9.6)1 (0.7) | 106 (87.6)13 (10.7)2 (1.7) |  |
| Birth weight for gestational age ( z-scores) | 0.05 ± 0.94 | 0.11 ± 1.13 | 0.10 ± 0.08 | 0.923 |
| Child energy intake at 18 months (kcal) | 1059 ± 444 | 1104 ± 366 | 1395 ± 812 | <0.0001 |
| BMI at 18 months (z-scores) | -0.07 + 1.00 | -0.13 + 0.99 | -0.04 + 1.02 |  0.717 |
| Σ skinfold at 18 months  | 17.4 + 7.3 | 17.8 + 6.2 | 17.9 + 7.5 |  0.824 |
| BMI at 5 years (z-scores) | -0.05 ± 1.03 |  -0.005 ± 1.1 | 0.11 ± 1.3 | 0.427 |
|  Σ skinfold at 5 years  | 28.1 ± 8.3 | 27.8 ± 9.1 | 29.4 ± 11.8 | 0.397 |

GUSTO, Growing Up in Singapore Towards healthy Outcomes. There were missing data for education (n = 3), breastfeeding (n = 10), maternal postpartum BMI at 48 months (n = 99), birth weight for gestational age (n = 6), early introduction to solid foods (n = 127), SSF (n = 188), screen time (n = 74) and outdoor playing (n = 168).

\*Early introduction to solids was defined as the introduction to foods other than milk before the age of 4 months (16 weeks of age).

1*p*-value across the SSB tertile categories was determined with the use of a χ2-analysis (categorical) or trend tests using SSB intake tertile categories as continuous variable (continuous). Value was presented as mean ± s.d. for continous data or n (%) for categorical data.
2 Values reflect median (IQR).
3 *p*<0.05 is statistically significant

Supplementary Table S3: Associations between sugar sweetened beverage (SSB) consumption at 18 months with adiposity measures at year 6 in a subset of n=451 subjects.

|  |  |  |  |
| --- | --- | --- | --- |
| **SSB intake at 18 months**  | **BMI z-scores1a(n=451)** | **SSF1b(n=367)** | **Overweight / obesity2a(n=451)** |
| Model 1(unadjusted) | **β(95% CI)** | **β(95% CI)** | **Relative risk(95% CI)** |
| 100ml/day increments | 0.09 (0.02, 0.15)\* | 0.99(0.23,1.76)\* | 1.16 (1.08, 1.24)\*\* |
| Low intake | Reference | Reference | Reference |
| Medium intake | 0.01 (-0.28, 0.30) | -0.72(-3.64,2.19) | 0.99 (0.58, 1.71) |
| High intake | 0.26 (-0.04, 0.55) | 0.72(-2.22,3.67) | 1.36 (0.83, 2.25) |
| *p-trend* | *p* = 0.085 | *p* =0.631 | *p* = 0.223 |
|  |  |  |  |
|  |  |  |  |
| Model 2(adjusted) |  |  |  |
| 100ml/day increments | 0.05 (-0.02, 0.11) | 0.40(-0.40,1.21) | 1.14 (1.06, 1.23)\*\* |
| Low intake | Reference | Reference | Reference |
| Medium intake | -0.02 (-0.30, 0.26) | -1.36(-4.41,1.69) | 0.95 (0.55, 1.64) |
| High intake | 0.07 (-0.22, 0.35) | -0.96(-4.16,2.23) | 1.02 (0.60, 1.72) |
| *p-trend* | *p* = 0.660 | *p* =0.56 | *p* = 0.256 |
|  |  |  |  |
| Model 3( energy intake adjusted) |  |  |  |
| 100ml/day increments | 0.035(-0.03,0.10) | 0.56(-0.23,1.35) | 1.00(0.99-1.01) |
| Low intake | Reference | Reference | Reference |
| Medium intake | -0.05(-0.36,0.23) | -1.14(-4.19,1.91) | 0.90(0.54,1.65) |
| High intake | 0.05(-0.29,0.30) | -1.25(-4.15,1.64) | 1.00(0.59,1.01) |
| *p-trend* | *p* =0.98 | *p* =0.46 | *p* =0.350 |
|  |  |  |  |

Abbreviations: CI, confidence interval; RR, relative risk; SSF, Sum of skinfolds. 1Estimated regression coefficients and relative risk2 (95% CI) of the associations between SSB intake tertiles (high and medium compared with low as reference) with BMI z-scores and overweight/obesity outcomes at 6 years of age. Trend tests were performed using categories of SSB intake as continuous variable in the linear regression and Poisson regression models. Models are adjusted for ethnicity, education, birth weight for gestational age, screen time, breastfeeding duration, maternal BMI 48 months postpartum and parity. Model 3 is model 2 additionally adjusted for energy intake at age 18 months \*\*P-value < 0.01. \*P-value < 0.05. aMedian(IQR),n: low intake (22-57 ml),n=150; medium intake (92-134 ml),n=151; high intake (188-319 ml),n=150.b Median(IQR),n: low intake (0-7 ml),n=135; medium intake (18-43 ml),n=136; high intake (99-238 ml),n=136.

Supplementary Table S4: Associations between sugar sweetened beverage (SSB) consumption at year 5 with adiposity measures at year 6 in a subset of n=451 subjects.

|  |  |  |  |
| --- | --- | --- | --- |
| **SSB intake at year 5** | **BMI z-scores1a(n=451)** | **SSF1b(n=367)** | **Overweight / obesity2a(n=451)** |
| Model 1(unadjusted) | **β(95% CI)** | **β(95% CI)** | **Relative risk(95% CI)** |
| 100ml/day increments | 0.15 (0.07, 0.23)\*\* | 1.11(0.35,.187)\* | 1.15 (1.07, 1.23)\*\* |
| Low intake | Reference | Reference | Reference |
| Medium intake | 0.36 (0.07, 0.65)\* | 1.84(-1.06,4.74) | 1.43 (0.82, 2.50) |
| High intake | 0.52 (0.23, 0.80)\*\* | 2.96(0.07,5.85)\* | 1.67 (0.97, 2.86) |
| *p-trend* | *p* < 0.0001\*\* | *p* =0.045 | *p* = 0.059 |
|  |  |  |  |
|  |  |  |  |
| Model 2(adjusted) |  |  |  |
| 100ml/day increments | 0.12 (0.04, 0.20)\*\* | 1.22(0.46,1.98)\*\* | 1.16 (1.08, 1.24)\*\* |
| Low intake | Reference | Reference | Reference |
| Medium intake | 0.34 (0.06, 0.62)\* | 1.41(-1.45,4.26) | 1.47 (0.86, 2.52) |
| High intake | 0.46 (0.18, 0.74)\*\* | 3.25(0.36,6.14)\* | 1.65 (0.97, 2.82) |
| *p-trend* | *p* = 0.001\*\* | *p* =0.03 | *p* = 0.063 |
|  |  |  |  |
|  |  |  |  |
| Model 3(energy intake adjusted) |  |  |  |
| 100ml/day increments | 0.12(0.04,0.19)\*\* | 1.43(0.63,2.23)\*\* | 1.20(1.11,1.29)\* |
| Low intake | Reference | Reference | Reference |
| Medium intake | 0.34(0.06,0.61)\* | 1.63(-1.25,4.50) | 2.20(1.19,4.06) |
| High intake | 0.46(0.17,0.76)\*\* | 3.85(0.81,6.89)\* | 2.50(1.35,4.65)\* |
| *p-trend* | *p* =0.002 | *p* =0.01 | *p* =0.038 |
|  |  |  |  |

Abbreviations: CI, confidence interval; RR, relative risk; SSF, Sum of skinfolds. 1Estimated regression coefficients and relative risk2 (95% CI) of the associations between SSB intake tertiles (high and medium compared with low as reference) with BMI z-scores and overweight/obesity outcomes at 6 years of age. Trend tests were performed using categories of SSB intake as continuous variable in the linear regression and Poisson regression models. Models are adjusted for ethnicity, education, birth weight for gestational age, screen time, breastfeeding duration, maternal BMI 48 months postpartum and parity. Model 3 is model 2 additionally adjusted for energy intake at age 5 years. \*\*P-value < 0.01. \*P-value < 0.05. aMedian(IQR),n: low intake (22-57 ml),n=150; medium intake (92-134 ml),n=151; high intake (188-319 ml),n=150. b Median(IQR),n: low intake (0-7 ml),n=135; medium intake (18-43 ml),n=136; high intake (99-238 ml),n=136.

**Supplementary Figure S1:** Flow chart of study participants assessed for SSB intakes at 18 months and 5 years of age and adiposity outcomes at 5 and 6 years of age in the GUSTO cohort.