**Text summary:** A total of 1 supplementary figure and 5 supplementary tables are included in this file.

**Supplemental Figure 1** Participants flow chart

**Eligible families (*n*= 2034)**

**Recruited families**

Main GUSTO (*n*= 1247)

**Unwilling to participate (*n*= 787)**

**Dropout (*n*= 65)**

**Twins (*n*= 10)**

***In vitro* fertilization (*n*= 85)**

**Live births delivery**

Babies Delivered (*n*= 1087)

**Neonates who completed ADP measurement (*n*= 251)**

**Neonates with MRI data who also completed ADP measurement (*n*= 222)**

**Supplemental Table 1** Comparisons of characteristics of participants with and without A) ADP measurement and B) MRI measurement

|  |  |  |  |
| --- | --- | --- | --- |
| A) | Participants without ADP measurement (*n*= 836) | Participants with ADP measurement (*n*= 251) | *P*-value |
| Sex |  |  | 0.98 |
| Male | 439 (53%) | 132 (53%) |  |
| Ethnicity |  |  | **<0.001** |
| Chinese | 494 (59%) | 102 (41%) |  |
| Malay | 182 (22%) | 107 (43%) |  |
| Indian | 160 (19%) | 42 (17%) |  |
|  |  |  |  |
| Birthweight, kg | 3.1 ± 0.5 | 3.1 ± 0.4 | 0.19 |
| Birth length, cm | 48.6 ± 2.1 | 48.2 ± 1.9 | **0.018** |
| Birth BMI, kg/m2 | 13.0 ± 1.3 | 13.4 ± 1.2 | **<0.001** |
| Gestational age at birth, wk | 38.7 ± 1.6 | 38.7 ± 1.2 | 0.79 |

|  |  |  |  |
| --- | --- | --- | --- |
| B) | Participants without MRI measurement (*n*= 865) | Participants with MRI measurement (*n*= 222) | *P*-value |
| Sex |  |  | 0.93 |
| Male | 455 (53%) | 116 (52%) |  |
| Ethnicity |  |  | **<0.001** |
| Chinese | 506 (59%) | 90 (41%) |  |
| Malay | 192 (22%) | 97 (44%) |  |
| Indian | 167 (19%) | 35 (16%) |  |
|  |  |  |  |
| Birthweight, kg | 3.1 ± 0.5 | 3.1 ± 0.4 | 0.35 |
| Birth length, cm | 48.6 ± 2.1 | 48.2 ± 1.9 | **0.010** |
| Birth BMI, kg/m2 | 13.0 ± 1.3 | 13.4 ± 1.2 | **0.001** |
| Gestational age at birth, wk | 38.7 ± 1.6 | 38.7 ± 1.2 | 0.92 |

*P*-values were derived from Pearson's χ2 tests for categorical variables and independent sample *t-*tests for continuous variables.

ADP, air displacement plethysmography; MRI, magnetic resonance imaging; BMI, body mass index

**Supplemental Table 2** Correlation matrix for anthropometric measures (*n*= 251)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Weight | Length | Weight/length | BMI | PI | Abdominal circumference | Triceps skinfold | Subscapular skinfold | Sum of skinfold |
| Weight | **1.00** |  |  |  |  |  |  |  |  |
| Length | 0.77 | **1.00** |  |  |  |  |  |  |  |
| Weight/length | 0.97 | 0.61 | **1.00** |  |  |  |  |  |  |
| BMI | 0.84 | 0.30 | 0.94 | **1.00** |  |  |  |  |  |
| PI | 0.53 | -0.12a | 0.71 | 0.91 | **1.00** |  |  |  |  |
| Abdominal circumference | 0.65 | 0.44 | 0.65 | 0.59 | 0.42 | **1.00** |  |  |  |
| Triceps skinfold | 0.57 | 0.34 | 0.59 | 0.57 | 0.44 | 0.43 | **1.00** |  |  |
| Subscapular skinfold | 0.53 | 0.37 | 0.53 | 0.47 | 0.33 | 0.39 | 0.80 | **1.00** |  |
| Sum of skinfold | 0.58 | 0.37 | 0.59 | 0.55 | 0.41 | 0.43 | 0.95 | 0.95 | **1.00** |

Values are Pearson’s correlation coefficients (rp). All correlations are significant at *P* <0.001, except for a*P* <0.05.

BMI, body mass index; PI, ponderal index

**Supplemental Table 3** Correlations of anthropometric measurements with ADP and MRI measurements, stratified by sex

**Male**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition (*n*= 132) | | | |  | MRI- Abdominal fat (*n*= 116) | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight | 0.67 | 0.58 | 0.93 | 0.69 |  | 0.87 | 0.83 | 0.77 | 0.77 |
| Length | 0.47 | 0.33 | 0.77 | 0.27 |  | 0.73 | 0.70 | 0.61 | 0.64 |
| Weight/length ratio | 0.67 | 0.61 | 0.90 | 0.77 |  | 0.84 | 0.80 | 0.75 | 0.74 |
| BMI | 0.62 | 0.61 | 0.78 | 0.83 |  | 0.73 | 0.69 | 0.67 | 0.65 |
| PI | 0.48 | 0.52 | 0.51 | 0.79 |  | 0.48 | 0.44 | 0.47 | 0.43 |
| Abdominal circumference | 0.45 | 0.40 | 0.65 | 0.54 |  | 0.50 | 0.47 | 0.38 | 0.49 |
| Triceps skinfold | 0.61 | 0.58 | 0.49 | 0.34 |  | 0.62 | 0.59 | 0.56 | 0.53 |
| Subscapular skinfold | 0.62 | 0.59 | 0.48 | 0.29 |  | 0.67 | 0.65 | 0.64 | 0.52 |
| Sum of skinfold | 0.64 | 0.61 | 0.51 | 0.33 |  | 0.67 | 0.65 | 0.63 | 0.55 |

**Female**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition (*n*= 119) | | | |  | MRI- Abdominal fat (*n*= 106) | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight | 0.70 | 0.63 | 0.91 | 0.57 |  | 0.86 | 0.84 | 0.77 | 0.73 |
| Length | 0.43 | 0.30 | 0.75 | 0.05a |  | 0.61 | 0.61 | 0.48 | 0.51 |
| Weight/length ratio | 0.72 | 0.68 | 0.85 | 0.69 |  | 0.84 | 0.82 | 0.77 | 0.71 |
| BMI | 0.65 | 0.67 | 0.67 | 0.80 |  | 0.72 | 0.69 | 0.69 | 0.60 |
| PI | 0.45 | 0.52 | 0.32 | 0.76 |  | 0.44 | 0.41 | 0.47 | 0.37 |
| Abdominal circumference | 0.47 | 0.44 | 0.58 | 0.44 |  | 0.63 | 0.62 | 0.57 | 0.49 |
| Triceps skinfold | 0.54 | 0.53 | 0.41 | 0.37 |  | 0.60 | 0.58 | 0.53 | 0.51 |
| Subscapular skinfold | 0.57 | 0.56 | 0.32 | 0.17a |  | 0.60 | 0.59 | 0.55 | 0.48 |
| Sum of skinfold | 0.58 | 0.57 | 0.39 | 0.28 |  | 0.63 | 0.62 | 0.57 | 0.52 |

Values are Pearson’s correlation coefficients (rp). All correlations are significant at *P* <0.01, except for a*P* >0.05.

ADP, air displacement plethysmography; MRI, magnetic resonance imaging; FM, fat mass; FMI, fat mass index; FFM, fat free mass; FFMI, fat free mass index; TAAT, total abdominal adipose tissue; sSAT, superficial subcutaneous adipose tissue; dSAT, deep subcutaneous adipose tissue; IAT, internal adipose tissue; BMI, body mass index; PI, ponderal index

**Supplemental Table 4** Correlations of anthropometric measurements with ADP and MRI measurements, stratified by ethnicity

**Chinese**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition (*n*= 102) | | | |  | MRI- Abdominal fat (*n*= 90) | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight | 0.72 | 0.665 | 0.92 | 0.65 |  | 0.81 | 0.77 | 0.74 | 0.78 |
| Length | 0.52 | 0.43 | 0.78 | 0.25b |  | 0.65 | 0.61 | 0.54 | 0.69 |
| Weight/length | 0.72 | 0.69 | 0.89 | 0.73 |  | 0.79 | 0.76 | 0.74 | 0.74 |
| BMI | 0.68 | 0.67 | 0.78 | 0.79 |  | 0.71 | 0.69 | 0.70 | 0.63 |
| PI | 0.51 | 0.56 | 0.52 | 0.77 |  | 0.50 | 0.49 | 0.53 | 0.38 |
| Abdominal circumference | 0.48 | 0.45 | 0.62 | 0.52 |  | 0.59 | 0.57 | 0.48 | 0.57 |
| Triceps skinfold | 0.64 | 0.63 | 0.45 | 0.29 |  | 0.66 | 0.63 | 0.65 | 0.59 |
| Subscapular skinfold | 0.63 | 0.62 | 0.39 | 0.16b |  | 0.67 | 0.66 | 0.63 | 0.58 |
| Sum of skinfold | 0.66 | 0.65 | 0.43 | 0.23 |  | 0.69 | 0.67 | 0.66 | 0.61 |

**Malay**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition (*n*= 107) | | | |  | MRI- Abdominal fat (*n*= 97) | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight | 0.65 | 0.56 | 0.92 | 0.67 |  | 0.86 | 0.83 | 0.73 | 0.69 |
| Length | 0.36 | 0.21a | 0.75 | 0.18b |  | 0.62 | 0.60 | 0.54 | 0.48 |
| Weight/length | 0.67 | 0.61 | 0.87 | 0.76 |  | 0.84 | 0.80 | 0.71 | 0.68 |
| BMI | 0.64 | 0.63 | 0.71 | 0.82 |  | 0.73 | 0.69 | 0.61 | 0.61 |
| PI | 0.50 | 0.56 | 0.41 | 0.77 |  | 0.48 | 0.46 | 0.40 | 0.42 |
| Abdominal circumference | 0.52 | 0.49 | 0.58 | 0.46 |  | 0.58 | 0.55 | 0.54 | 0.47 |
| Triceps skinfold | 0.53 | 0.51 | 0.43 | 0.39 |  | 0.56 | 0.54 | 0.47 | 0.44 |
| Subscapular skinfold | 0.55 | 0.54 | 0.37 | 0.29 |  | 0.59 | 0.57 | 0.57 | 0.41 |
| Sum of skinfold | 0.58 | 0.55 | 0.42 | 0.36 |  | 0.61 | 0.59 | 0.55 | 0.45 |

**Indian**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition (*n*= 42) | | | |  | MRI- Abdominal fat (*n*= 35) | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight | 0.58 | 0.46 | 0.93 | 0.65 |  | 0.84 | 0.81 | 0.74 | 0.75 |
| Length | 0.46 | 0.29a | 0.77 | 0.23b |  | 0.64 | 0.68 | 0.45 | 0.44 |
| Weight/length | 0.57 | 0.48 | 0.90 | 0.75 |  | 0.83 | 0.78 | 0.78 | 0.79 |
| BMI | 0.50 | 0.47 | 0.75 | 0.82 |  | 0.75 | 0.67 | 0.77 | 0.78 |
| PI | 0.29a | 0.35b | 0.40 | 0.75 |  | 0.51 | 0.40a | 0.61 | 0.63 |
| Abdominal circumference | 0.32b | 0.24a | 0.61 | 0.42 |  | 0.47 | 0.53 | 0.35a | 0.20b |
| Triceps skinfold | 0.53 | 0.51 | 0.40 | 0.30b |  | 0.58 | 0.62 | 0.48 | 0.33b |
| Subscapular skinfold | 0.60 | 0.58 | 0.33a | 0.14b |  | 0.64 | 0.66 | 0.57 | 0.43a |
| Sum of skinfold | 0.60 | 0.58 | 0.38a | 0.22b |  | 0.64 | 0.67 | 0.55 | 0.40a |

Values are Pearson’s correlation coefficients (rp). All correlations are significant at *P* <0.01, except for a*P* <0.05 & b*P* >0.05.

ADP, air displacement plethysmography; MRI, magnetic resonance imaging; FM, fat mass; FMI, fat mass index; FFM, fat free mass; FFMI, fat free mass index; TAAT, total abdominal adipose tissue; sSAT, superficial subcutaneous adipose tissue; dSAT, deep subcutaneous adipose tissue; IAT, internal adipose tissue; BMI, body mass index; PI, ponderal index

**Supplemental Table 5** Correlations of z-scores for anthropometric measurements with ADP (*n*= 251) and MRI measurements (*n*= 222)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | ADP- Total body composition | | | |  | MRI- Abdominal fat | | | |
|  | FM | FMI | FFM | FFMI |  | TAAT | sSAT | dSAT | IAT |
| Weight-for-age z-score | 0.66 | 0.59 | 0.87 | 0.60 |  | 0.82 | 0.79 | 0.73 | 0.68 |
| Length-for-age z-score | 0.43 | 0.30 | 0.68 | 0.11a |  | 0.62 | 0.62 | 0.51 | 0.50 |
| BMI-for-age z-score | 0.62 | 0.62 | 0.71 | 0.81 |  | 0.69 | 0.66 | 0.65 | 0.60 |
| Weight-for-length z-score | 0.44 | 0.50 | 0.43 | 0.77 |  | 0.44 | 0.40 | 0.44 | 0.40 |

Values are Pearson’s correlation coefficients (rp). All correlations are significant at *P* <0.001 except for a*P* >0.05.

ADP, air displacement plethysmography; MRI, magnetic resonance imaging; FM, fat mass; FMI, fat mass index; FFM, fat free mass; FFMI, fat free mass index; TAAT, total abdominal adipose tissue; sSAT, superficial subcutaneous adipose tissue; dSAT, deep subcutaneous adipose tissue; IAT, internal adipose tissue; BMI, body mass index