

S1 File. Descriptive of the sample.

Table 1. Descriptive data (main sample)

| Descriptives (Main Sample) | | | | | | | | | |
|----------------------------|---------|--------|----------|----------------|------------|----------------------------------|-------------|---------|----------|
| | | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Age (y) | | | | | Lower Bound | Upper Bound | | |
| Weight (kg) | 12.00 | 39.00 | 47.54 | 13.21 | 2.12 | 43.26 | 51.82 | 30.50 | 86.00 |
| | 13.00 | 41.00 | 52.33 | 11.38 | 1.78 | 48.74 | 55.92 | 33.70 | 84.40 |
| | 14.00 | 80.00 | 59.22 | 13.24 | 1.48 | 56.28 | 62.17 | 29.70 | 116.00 |
| | 15.00 | 67.00 | 61.82 | 8.97 | 1.10 | 59.63 | 64.01 | 42.40 | 84.80 |
| | 16.00 | 72.00 | 63.67 | 9.44 | 1.11 | 61.45 | 65.89 | 44.90 | 104.60 |
| | 17.00 | 75.00 | 68.78 | 10.06 | 1.15 | 66.49 | 71.06 | 47.50 | 100.60 |
| | Total | 374.00 | 60.48 | 12.72 | 0.66 | 59.24 | 61.82 | 29.70 | 116.00 |
| Height (m) | 12.00 | 39.00 | 1.52 | 0.08 | 0.01 | 1.49 | 1.54 | 1.35 | 1.70 |
| | 13.00 | 41.00 | 1.61 | 0.08 | 0.01 | 1.58 | 1.63 | 1.47 | 1.76 |
| | 14.00 | 80.00 | 1.67 | 0.08 | 0.01 | 1.66 | 1.69 | 1.44 | 1.89 |
| | 15.00 | 67.00 | 1.71 | 0.05 | 0.01 | 1.70 | 1.72 | 1.60 | 1.83 |
| | 16.00 | 72.00 | 1.74 | 0.07 | 0.01 | 1.72 | 1.75 | 1.60 | 1.98 |
| | 17.00 | 75.00 | 1.75 | 0.06 | 0.01 | 1.73 | 1.76 | 1.62 | 1.93 |
| | Total | 374.00 | 1.68 | 0.10 | 0.01 | 1.67 | 1.69 | 1.35 | 1.98 |
| Body Mass Index(kg/m²) | 12.00 | 39.00 | 20.55 | 4.95 | 0.79 | 18.95 | 22.15 | 14.85 | 37.22 |
| | 13.00 | 41.00 | 20.04 | 3.21 | 0.50 | 19.03 | 21.05 | 15.24 | 32.56 |
| | 14.00 | 80.00 | 21.02 | 3.61 | 0.40 | 20.22 | 21.82 | 14.32 | 35.80 |
| | 15.00 | 67.00 | 21.10 | 2.49 | 0.30 | 20.49 | 21.71 | 16.38 | 28.33 |
| | 16.00 | 72.00 | 21.10 | 2.70 | 0.32 | 20.47 | 21.74 | 15.83 | 31.93 |
| | 17.00 | 75.00 | 23.09 | 6.50 | 0.31 | 21.85 | 23.09 | 16.44 | 31.18 |
| | Total | 374.00 | 21.19 | 4.26 | 0.17 | 20.86 | 21.53 | 14.32 | 37.22 |
| Wait Circunference (cm) | 12.00 | 39.00 | 67.91 | 9.59 | 1.58 | 64.72 | 71.11 | 55.20 | 89.60 |
| | 13.00 | 41.00 | 68.87 | 8.55 | 1.35 | 66.13 | 71.60 | 57.00 | 99.50 |
| | 14.00 | 80.00 | 70.08 | 7.67 | 0.86 | 68.38 | 71.79 | 55.70 | 97.00 |
| | 15.00 | 67.00 | 70.97 | 5.61 | 0.69 | 69.59 | 72.35 | 58.90 | 88.00 |
| | 16.00 | 72.00 | 71.45 | 6.11 | 0.72 | 70.01 | 72.89 | 57.00 | 90.90 |
| | 17.00 | 75.00 | 75.24 | 7.36 | 0.84 | 73.58 | 76.92 | 62.30 | 103.60 |
| | Total | 374.00 | 71.20 | 7.65 | 0.40 | 70.45 | 72.01 | 55.20 | 103.60 |
| Body Fat (%) | 12.00 | 39.00 | 27.69 | 7.49 | 1.20 | 25.27 | 30.12 | 16.50 | 43.40 |
| | 13.00 | 41.00 | 23.75 | 5.70 | 0.89 | 21.96 | 25.55 | 16.00 | 42.20 |
| | 14.00 | 80.00 | 20.03 | 4.85 | 0.54 | 18.95 | 21.11 | 15.10 | 40.20 |
| | 15.00 | 67.00 | 19.33 | 4.26 | 0.52 | 18.29 | 20.37 | 13.90 | 37.40 |
| | 16.00 | 72.00 | 18.06 | 4.31 | 0.51 | 17.05 | 19.07 | 13.60 | 39.60 |
| | 17.00 | 75.00 | 19.51 | 4.82 | 0.55 | 18.30 | 20.49 | 13.50 | 35.30 |
| | Total | 374.00 | 20.63 | 5.81 | 0.30 | 20.01 | 21.19 | 13.50 | 43.40 |
| Fat Mass (g) | 12.00 | 39.00 | 14536.63 | 6981.06 | 1180.01 | 12138.55 | 16934.70 | 6039.00 | 28510.00 |
| | 13.00 | 41.00 | 13021.67 | 5562.94 | 890.78 | 11218.37 | 14824.96 | 6891.00 | 31050.00 |
| | 14.00 | 80.00 | 12750.80 | 6929.70 | 794.89 | 11167.30 | 14334.31 | 6806.00 | 47491.00 |
| | 15.00 | 67.00 | 13243.70 | 6777.64 | 847.20 | 11550.70 | 14936.71 | 6958.00 | 45610.00 |
| | 16.00 | 72.00 | 12323.25 | 4707.01 | 575.05 | 11175.12 | 13471.38 | 6460.00 | 36196.00 |
| | 17.00 | 75.00 | 14830.16 | 8365.19 | 959.55 | 12918.63 | 16741.69 | 7474.00 | 55068.00 |
| | Total | 374.00 | 13406.26 | 6778.30 | 358.75 | 12700.73 | 14111.79 | 6039.00 | 55068.00 |

Table 2. Descriptive data (validation sample)

| Descriptives (Validation Sample) | | | | | | | | | |
|--|-------|-------|----------|-------------------|---------------|-------------------------------------|----------------|---------|----------|
| | | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
| | Age | | | | | Lower Bound | Upper Bound | | |
| Weight (kg) | 12.00 | 4.00 | 44.15 | 6.33 | 3.17 | 34.07 | 54.23 | 35.00 | 48.40 |
| | 13.00 | 5.00 | 58.50 | 8.47 | 3.79 | 47.98 | 69.02 | 51.60 | 72.30 |
| | 14.00 | 9.00 | 60.63 | 7.44 | 2.48 | 54.91 | 66.35 | 53.70 | 78.50 |
| | 15.00 | 8.00 | 59.54 | 8.98 | 3.17 | 52.03 | 67.04 | 51.60 | 78.30 |
| | 16.00 | 8.00 | 56.25 | 4.71 | 1.67 | 52.31 | 60.19 | 48.90 | 63.40 |
| | 17.00 | 8.00 | 66.39 | 14.86 | 5.25 | 53.97 | 78.81 | 48.40 | 91.40 |
| | Total | 42.00 | 58.86 | 10.50 | 1.62 | 55.59 | 62.13 | 35.00 | 91.40 |
| Height (m) | 12.00 | 4.00 | 1.49 | 0.04 | 0.02 | 1.42 | 1.56 | 1.46 | 1.55 |
| | 13.00 | 5.00 | 1.68 | 0.06 | 0.02 | 1.61 | 1.75 | 1.65 | 1.78 |
| | 14.00 | 9.00 | 1.69 | 0.04 | 0.01 | 1.66 | 1.72 | 1.63 | 1.74 |
| | 15.00 | 8.00 | 1.73 | 0.05 | 0.02 | 1.69 | 1.77 | 1.66 | 1.79 |
| | 16.00 | 8.00 | 1.71 | 0.06 | 0.02 | 1.66 | 1.76 | 1.64 | 1.79 |
| | 17.00 | 8.00 | 1.72 | 0.07 | 0.02 | 1.67 | 1.78 | 1.62 | 1.82 |
| | Total | 42.00 | 1.69 | 0.08 | 0.01 | 1.66 | 1.71 | 1.46 | 1.82 |
| Body Mass Index(kg/m ²) | 12.00 | 4.00 | 19.93 | 2.52 | 1.26 | 15.92 | 23.93 | 16.40 | 22.25 |
| | 13.00 | 5.00 | 20.63 | 1.79 | 0.80 | 18.42 | 22.85 | 18.73 | 22.95 |
| | 14.00 | 9.00 | 21.22 | 2.53 | 0.84 | 19.28 | 23.16 | 18.93 | 26.69 |
| | 15.00 | 8.00 | 19.84 | 2.83 | 1.00 | 17.47 | 22.21 | 17.25 | 26.16 |
| | 16.00 | 8.00 | 19.35 | 1.89 | 0.67 | 17.77 | 20.93 | 15.77 | 22.20 |
| | 17.00 | 8.00 | 22.17 | 3.66 | 1.29 | 19.11 | 25.23 | 18.44 | 27.59 |
| | Total | 42.00 | 20.59 | 2.70 | 0.42 | 19.75 | 21.43 | 15.77 | 27.59 |
| Wait Circunference (cm) | 12.00 | 4.00 | 66.20 | 5.37 | 2.69 | 57.65 | 74.75 | 59.90 | 72.90 |
| | 13.00 | 5.00 | 69.86 | 3.90 | 1.74 | 65.02 | 74.70 | 67.00 | 76.10 |
| | 14.00 | 9.00 | 72.50 | 5.91 | 1.97 | 67.96 | 77.04 | 65.90 | 86.00 |
| | 15.00 | 8.00 | 69.83 | 4.47 | 1.58 | 66.09 | 73.56 | 64.80 | 80.00 |
| | 16.00 | 8.00 | 66.56 | 5.45 | 1.93 | 62.00 | 71.12 | 56.50 | 73.20 |
| | 17.00 | 8.00 | 75.83 | 7.85 | 2.78 | 69.26 | 82.39 | 65.50 | 86.50 |
| | Total | 42.00 | 70.58 | 6.39 | 0.99 | 68.59 | 72.57 | 56.50 | 86.50 |
| Body Fat (%) | 12.00 | 4.00 | 31.53 | 4.00 | 2.00 | 25.16 | 37.89 | 25.70 | 34.80 |
| | 13.00 | 5.00 | 19.78 | 4.04 | 1.81 | 14.76 | 24.80 | 15.60 | 24.90 |
| | 14.00 | 9.00 | 21.01 | 7.40 | 2.47 | 15.32 | 26.70 | 14.10 | 36.80 |
| | 15.00 | 8.00 | 17.88 | 2.17 | 0.77 | 16.06 | 19.69 | 15.60 | 22.00 |
| | 16.00 | 8.00 | 17.89 | 1.27 | 0.45 | 16.82 | 18.95 | 15.60 | 20.00 |
| | 17.00 | 8.00 | 18.98 | 4.83 | 1.71 | 14.94 | 23.01 | 14.20 | 29.10 |
| | Total | 42.00 | 20.29 | 5.79 | 0.89 | 18.48 | 22.09 | 14.10 | 36.80 |
| Fat Mass (g) | 12.00 | 4.00 | 14267.00 | 3740.69 | 1870.34 | 8314.73 | 20219.27 | 8788.00 | 16869.00 |
| | 13.00 | 5.00 | 11614.40 | 3066.31 | 1371.29 | 7807.08 | 15421.72 | 7793.00 | 15245.00 |
| | 14.00 | 9.00 | 13030.75 | 5993.61 | 2119.06 | 8019.97 | 18041.53 | 8520.00 | 23486.00 |
| | 15.00 | 8.00 | 11857.38 | 5624.87 | 1988.69 | 7154.87 | 16559.88 | 8861.00 | 25621.00 |
| | 16.00 | 8.00 | 10547.75 | 1640.00 | 579.83 | 9176.67 | 11918.83 | 8684.00 | 14294.00 |
| | 17.00 | 8.00 | 15615.00 | 7033.17 | 2486.60 | 9735.12 | 21494.88 | 7244.00 | 26494.00 |
| | Total | 42.00 | 12769.44 | 5110.57 | 798.14 | 11156.34 | 14382.53 | 7244.00 | 26494.00 |

Table 3. Descriptive data of skinfold thickness (n=374)

Descriptive Skinfold Thickness (N = 374)

| Age (years) | | TR (mm) | SB (mm) | AB (mm) | SI (mm) | TH (mm) | MA (mm) | CH (mm) | BI (mm) | CF (mm) |
|-------------|-----------------|------------------|-------------------|--------------------|-------------------|-------------------|-------------------|-------------------|------------------|-------------------|
| 12 | Mean \pm SD | 16.36 \pm 8.21 | 15.82 \pm 10.96 | 24.78 \pm 17.37 | 17.72 \pm 14.43 | 24.79 \pm 12.08 | 13.70 \pm 9.39 | 15.74 \pm 11.00 | 10.09 \pm 5.85 | 16.59 \pm 8.13 |
| | Median \pm IA | 13.60 \pm 10.0 | 11.30 \pm 14.60 | 23.10 \pm 20.90 | 12.9 \pm 16.10 | 20.90 \pm 10.80 | 11.50 \pm 12.90 | 11.50 \pm 17.80 | 7.60 \pm 9.70 | 14.90 \pm 10.30 |
| 13 | Mean \pm SD | 12.34 \pm 5.81 | 11.69 \pm 7.81 | 17.80 \pm 11.62 | 12.17 \pm 8.47 | 19.01 \pm 9.53 | 10.45 \pm 6.89 | 11.82 \pm 8.04 | 7.19 \pm 4.37 | 12.55 \pm 5.90 |
| | Median \pm IA | 11.15 \pm 5.93 | 9.15 \pm 4.20 | 15.00 \pm 14.73 | 9.95 \pm 9.45 | 15.85 \pm 10.45 | 9.05 \pm 6.83 | 9.15 \pm 7.03 | 5.45 \pm 3.78 | 11.20 \pm 8.83 |
| 14 | Mean \pm SD | 10.36 \pm 4.62 | 10.91 \pm 6.55 | 16.015 \pm 11.55 | 10.51 \pm 9.03 | 15.43 \pm 7.31 | 9.25 \pm 7.27 | 8.99 \pm 5.89 | 5.56 \pm 2.63 | 10.10 \pm 5.33 |
| | Median \pm IA | 9.00 \pm 4.55 | 8.80 \pm 4.20 | 12.10 \pm 9.75 | 7.40 \pm 4.30 | 12.80 \pm 6.45 | 6.50 \pm 4.35 | 6.80 \pm 3.85 | 4.60 \pm 2.00 | 9.00 \pm 3.30 |
| 15 | Mean \pm SD | 9.18 \pm 3.90 | 10.43 \pm 4.95 | 14.83 \pm 9.73 | 10.01 \pm 7.28 | 13.85 \pm 6.40 | 8.08 \pm 4.34 | 8.06 \pm 4.32 | 4.83 \pm 1.72 | 9.41 \pm 4.69 |
| | Median \pm IA | 8.60 \pm 4.00 | 9.10 \pm 4.50 | 11.30 \pm 8.40 | 7.30 \pm 4.40 | 12.20 \pm 6.70 | 6.40 \pm 3.20 | 6.70 \pm 3.20 | 4.30 \pm 1.50 | 8.00 \pm 4.70 |
| 16 | Mean \pm SD | 8.56 \pm 3.76 | 10.11 \pm 4.99 | 13.11 \pm 8.34 | 8.90 \pm 6.79 | 12.81 \pm 7.05 | 7.59 \pm 4.93 | 7.02 \pm 3.70 | 4.52 \pm 1.76 | 7.98 \pm 3.68 |
| | Median \pm IA | 7.80 \pm 3.65 | 8.70 \pm 3.25 | 10.85 \pm 5.78 | 6.80 \pm 4.28 | 10.75 \pm 5.43 | 6.15 \pm 2.65 | 6.00 \pm 2.35 | 4.10 \pm 1.30 | 7.15 \pm 2.68 |
| 17 | Mean \pm SD | 9.17 \pm 4.63 | 11.40 \pm 6.05 | 16.07 \pm 10.65 | 9.91 \pm 7.32 | 12.66 \pm 6.26 | 8.50 \pm 6.10 | 7.91 \pm 4.92 | 4.61 \pm 1.98 | 8.43 \pm 3.88 |
| | Median \pm IA | 7.90 \pm 4.05 | 9.50 \pm 3.85 | 12.10 \pm 9.60 | 7.00 \pm 4.65 | 11.10 \pm 4.40 | 6.30 \pm 3.60 | 6.10 \pm 3.25 | 4.10 \pm 1.55 | 7.60 \pm 3.25 |
| Total | Mean \pm SD | 10.40 \pm 5.47 | 11.36 \pm 6.84 | 16.35 \pm 11.66 | 10.92 \pm 9.00 | 15.44 \pm 8.61 | 9.16 \pm 6.61 | 9.23 \pm 6.63 | 5.68 \pm 3.43 | 10.17 \pm 5.69 |
| | Median \pm IA | 8.85 \pm 4.90 | 9.10 \pm 4.33 | 12.00 \pm 10.58 | 7.40 \pm 5.40 | 12.60 \pm 8.53 | 6.60 \pm 4.33 | 6.75 \pm 4.33 | 4.60 \pm 2.23 | 8.50 \pm 4.90 |

Where: triceps (TR); subscapularis (SB); Abdominal (AB); Suprailiac (SI); Thigh (TH); Medium Axillary (MA); Chest (CH); Biceps (BI); Calf (CF)

Table 4. Pearson correlation with body fat percentage.

Correlations (N = 374)

| | | Height | WC | TR | SB | AB | SI | TH | MA | CH | BI | CF | % BF (DXA) |
|---------------|---------------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|---------|------------|
| Age | Pearson Correlation | .671** | .284** | -.346** | -.140** | -.179** | -.206** | -.370** | -.202** | -.319** | -.422** | -.406** | .027 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .007 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .609 |
| Height | Pearson Correlation | 1 | .418** | -.228** | -.053 | -.051 | -.078 | -.254** | -.071 | -.177** | -.267** | -.254** | .174** |
| | Sig. (2-tailed) | | .000 | .000 | .303 | .328 | .133 | .000 | .172 | .001 | .000 | .000 | .001 |
| WC | Pearson Correlation | | 1 | .446** | .644** | .625** | .608** | .407** | .607** | .534** | .426** | .380** | .599** |
| | Sig. (2-tailed) | | | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| TR | Pearson Correlation | | | 1 | .827** | .869** | .859** | .913** | .826** | .871** | .891** | .893** | .582** |
| | Sig. (2-tailed) | | | | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| SB | Pearson Correlation | | | | 1 | .896** | .903** | .787** | .889** | .877** | .814** | .742** | .626** |
| | Sig. (2-tailed) | | | | | .000 | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| AB | Pearson Correlation | | | | | 1 | .956** | .836** | .906** | .909** | .831** | .802** | .652** |
| | Sig. (2-tailed) | | | | | | .000 | .000 | .000 | .000 | .000 | .000 | .000 |
| SI | Pearson Correlation | | | | | | 1 | .823** | .938** | .908** | .849** | .812** | .627** |
| | Sig. (2-tailed) | | | | | | | .000 | .000 | .000 | .000 | .000 | .000 |
| TH | Pearson Correlation | | | | | | | 1 | .794** | .839** | .842** | .904** | .571** |
| | Sig. (2-tailed) | | | | | | | | .000 | .000 | .000 | .000 | .000 |
| MA | Pearson Correlation | | | | | | | | 1 | .896** | .827** | .761** | .612** |
| | Sig. (2-tailed) | | | | | | | | | .000 | .000 | .000 | .000 |
| CH | Pearson Correlation | | | | | | | | | 1 | .910** | .818** | .560** |
| | Sig. (2-tailed) | | | | | | | | | | .000 | .000 | .000 |
| BI | Pearson Correlation | | | | | | | | | | 1 | .847** | .533** |
| | Sig. (2-tailed) | | | | | | | | | | | .000 | .000 |
| CF | Pearson Correlation | | | | | | | | | | | 1 | .557** |
| | Sig. (2-tailed) | | | | | | | | | | | | .000 |

Where: triceps (TR); subscapularis (SB); Abdominal (AB); Suprailiac (SI); Thigh (TH); Medium Axillary (MA); Chest (CH); Biceps (BI); Calf (CF); Waist Circumference (WC); Body Fat Percentage (%BF)

Table 5. Paired samples test in validation sample

| | | Paired Differences | | | | | t | df | Sig. (2-tailed) |
|--------|------------------|--------------------|----------------|-----------------|---|---------|------|----|-----------------|
| | | | | | 95% Confidence Interval of the Difference | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | | | |
| Pair 1 | %BF - Equation 3 | .30000 | 3.25584 | .50239 | -.71459 | 1.31459 | .597 | 41 | .554 |
| Pair 2 | %BF - Equation 2 | .40952 | 3.19602 | .49316 | -.58643 | 1.40547 | .830 | 41 | .411 |
| Pair 3 | %BF - Equation 1 | .35714 | 2.81634 | .43457 | -.52049 | 1.23478 | .822 | 41 | .416 |

Paired Samples Statistics

| | | Mean | N | Std. Deviation | Std. Error Mean |
|--------|---------|---------|----|----------------|-----------------|
| Pair 1 | %BF DXA | 20.2857 | 42 | 5.79350 | .89396 |
| | EQ3 | 19.9857 | 42 | 4.90423 | .75674 |
| Pair 2 | %BF DXA | 20.2857 | 42 | 5.79350 | .89396 |
| | EQ2 | 19.8762 | 42 | 5.15652 | .79567 |
| Pair 3 | %BF DXA | 20.2857 | 42 | 5.79350 | .89396 |
| | EQ1 | 19.9286 | 42 | 5.04237 | .77805 |

Paired Samples Correlations

| | | N | Correlation | Sig. |
|--------|------------|----|-------------|------|
| Pair 1 | GDXA & EQ3 | 42 | .827 | .000 |
| Pair 2 | GDXA & EQ2 | 42 | .836 | .000 |
| Pair 3 | GDXA & EQ1 | 42 | .874 | .000 |