**Supplementary Table 1.** Association analysis between HOMA-IR index or presence of Metabolic Syndrome (MetS) and gender (M=male), age, Body Mass Index (BMI), waist circumference (WC), waist to height ratio (WtoH), body roundness index (BRI), a body shape index (ABSI), visceral adiposity index (VAI), plasma triglycerides, total and HDL-cholesterol (Chol), glucose and insulin, HOMA-IR index, systolic (SBP) and diastolic blood pressure (DBP), presence of diabetes, hypertension, dyslipidemia in all and overweight-obese subjects on baseline data. Same analysis is performed in the subgroup undergoing follow-up vs. 5-year HOMA-IR index or presence of Metabolic Syndrome. ρ: Sperman's rho. Different letters indicate different (p<0.05) association strengths between tested factors for each column, as assessed by Meng, Rosenthal and Rubin's z-test.

| | All (n=1965) | | | | Overweight/Obese (n=1140) | | | | Follow-up Overweight/Obese (n=263) | | | |
| | Basal HOMA-IR | | Basal MetS | | Basal HOMA-IR | | Basal MetS | | 5-year HOMA-IR | | 5-year MetS | |
| Basal | ρ | p | ρ | p | ρ | p | ρ | p | ρ | p | ρ | p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender (M) | 0.127 | <0.001 | - | 0.094 | 0.028 | 0.349 | - | 0.044 | 0.116 | 0.061 | - | 0.805 |
| Age | 0.197 | <0.001 | 0.274 | <0.001 | 0.127 | <0.001 | 0.182 | <0.001 | -0.046 | 0.461 | 0.049 | 0.427 |
| BMI | 0.586 | <0.001 | 0.481 | <0.001 | 0.488 | <0.001 | 0.361 | <0.001 | 0.431 | <0.001 | 0.331 | <0.001 |
| WC | $0.556^a$ | <0.001 | $0.492^a$ | <0.001 | $0.449^a$ | <0.001 | $0.384^a$ | <0.001 | $0.340^a$ | <0.001 | $0.288^a$ | <0.001 |
| WtoH | $0.530^a$ | <0.001 | $0.503^a$ | <0.001 | $0.408^a$ | <0.001 | $0.398^a$ | <0.001 | $0.261^a$ | <0.001 | $0.293^a$ | <0.001 |
| BRI | $0.530^a$ | <0.001 | $0.503^a$ | <0.001 | $0.408^a$ | <0.001 | $0.398^a$ | <0.001 | $0.261^a$ | <0.001 | $0.293^a$ | <0.001 |
| ABSI | $0.102^b$ | <0.001 | $0.163^b$ | <0.001 | $0.087^b$ | 0.003 | $0.177^b$ | <0.001 | $-0.042^b$ | 0.500 | $0.034^b$ | 0.583 |
| VAI | $0.458^c$ | <0.001 | $0.553^c$ | <0.001 | $0.396^a$ | <0.001 | $0.586^c$ | <0.001 | $0.286^a$ | <0.001 | $0.461^c$ | <0.001 |
| Triglycerides | 0.427 | <0.001 | 0.442 | <0.001 | 0.350 | <0.001 | 0.474 | <0.001 | 0.297 | <0.001 | 0.411 | <0.001 |
| Total-Chol | 0.084 | <0.001 | 0.058 | 0.010 | 0.016 | 0.579 | -0.017 | 0.555 | -0.018 | 0.766 | -0.011 | 0.856 |
| HDL-Chol | -0.277 | <0.001 | -0.341 | <0.001 | -0.249 | <0.001 | -0.395 | <0.001 | -0.151 | 0.015 | -0.256 | <0.001 |
| Glucose | 0.506 | <0.001 | 0.365 | <0.001 | 0.495 | <0.001 | 0.339 | <0.001 | 0.334 | <0.001 | 0.361 | <0.001 |
| Insulin | 0.970 | <0.001 | 0.408 | <0.001 | 0.957 | <0.001 | 0.359 | <0.001 | 0.665 | <0.001 | 0.379 | <0.001 |
| HOMA-IR | - | - | 0.407 | <0.001 | - | - | 0.425 | <0.001 | 0.684 | <0.001 | 0.432 | <0.001 |
| SBP | 0.271 | <0.001 | 0.288 | <0.001 | 0.147 | <0.001 | 0.205 | <0.001 | 0.149 | 0.016 | 0.071 | 0.252 |
| DBP | 0.261 | <0.001 | 0.262 | <0.001 | 0.199 | <0.001 | 0.199 | <0.001 | 0.230 | <0.001 | 0.108 | 0.082 |
| Diabetes | 0.336 | <0.001 | - | <0.001 | 0.363 | <0.001 | - | <0.001 | 0.244 | <0.001 | - | <0.001 |
| Hypertension | 0.293 | <0.001 | - | <0.001 | 0.192 | <0.001 | - | <0.001 | 0.196 | 0.001 | - | <0.001 |
| Dyslipidemia | 0.349 | <0.001 | - | <0.001 | 0.297 | <0.001 | - | <0.001 | 0.272 | <0.001 | - | <0.001 |

**Supplementary Table 2.** Association analysis between HOMA-IR index or presence of Metabolic Syndrome (MetS) and gender (M=male), age, Body Mass Index (BMI), waist circumference (WC), waist to height ratio (WtoH), body roundness index (BRI), a body shape index (ABSI), visceral adiposity index (VAI), plasma triglycerides, total and HDL-cholesterol (Chol), glucose and insulin, HOMA-IR index, systolic (SBP) and diastolic blood pressure (DBP), presence of diabetes, hypertension, dyslipidemia in lean subjects. ρ: Sperman's rho. Different letters indicate different (p<0.05) association strengths between tested factors for each column, as assessed by Meng, Rosenthal and Rubin's z-test. * association strength lower (p<0.05) than in obese/overweight individuals and all study population, also by Meng, Rosenthal and Rubin's z-test.

| | Lean (n=825) | | | |
| --- | --- | --- | --- | --- |
| | Basal HOMA-IR | | Basal MetS | |
| | ρ | p | ρ | p |
| Gender (M) | 0.028 | 0.420 | - | 0.276 |
| Age | -0.024 | 0.482 | 0.231 | <0.001 |
| BMI | 0.212 | <0.001 | 0.125 | <0.001 |
| WC | 0.220[a]* | <0.001 | 0.243[a]* | <0.001 |
| WtoH | 0.217[a]* | <0.001 | 0.250[a]* | <0.001 |
| BRI | 0.217[a]* | <0.001 | 0.250[a]* | <0.001 |
| ABSI | 0.117[b] | <0.001 | 0.220[a]* | <0.001 |
| VAI | 0.283[a]* | <0.001 | 0.292[a]* | <0.001 |
| Triglycerides | 0.254 | <0.001 | 0.248 | <0.001 |
| Total-Chol | 0.051 | 0.147 | 0.109 | 0.002 |
| HDL-Chol | -0.083 | 0.017 | -0.107 | <0.001 |
| Glucose | 0.395 | <0.001 | 0.224 | <0.001 |
| Insulin | 0.965 | <0.001 | 0.141 | <0.001 |
| HOMA-IR | - | - | 0.200 | <0.001 |
| SBP | 0.110 | 0.002 | 0.183 | <0.001 |
| DBP | 0.051 | 0.141 | 0.105 | 0.003 |
| Diabetes | - | <0.001 | 0.191 | <0.001 |
| Hypertension | - | <0.001 | 0.110 | 0.002 |
| Dyslipidemia | - | <0.001 | 0.175 | <0.001 |

**Supplementary Table 3.** Multiple regression analyses between body mass index (BMI), waist circumference (WC), waist to height ratio (WtoH), body roundness index (BRI), a body shape index (ABSI) and visceral adiposity index (VAI) and HOMA-IR or presence of Metabolic Syndrome in lean subjects in different statistical adjustment models. B: Coefficient, SE: Standard Error; t: t value; z: Wald test.
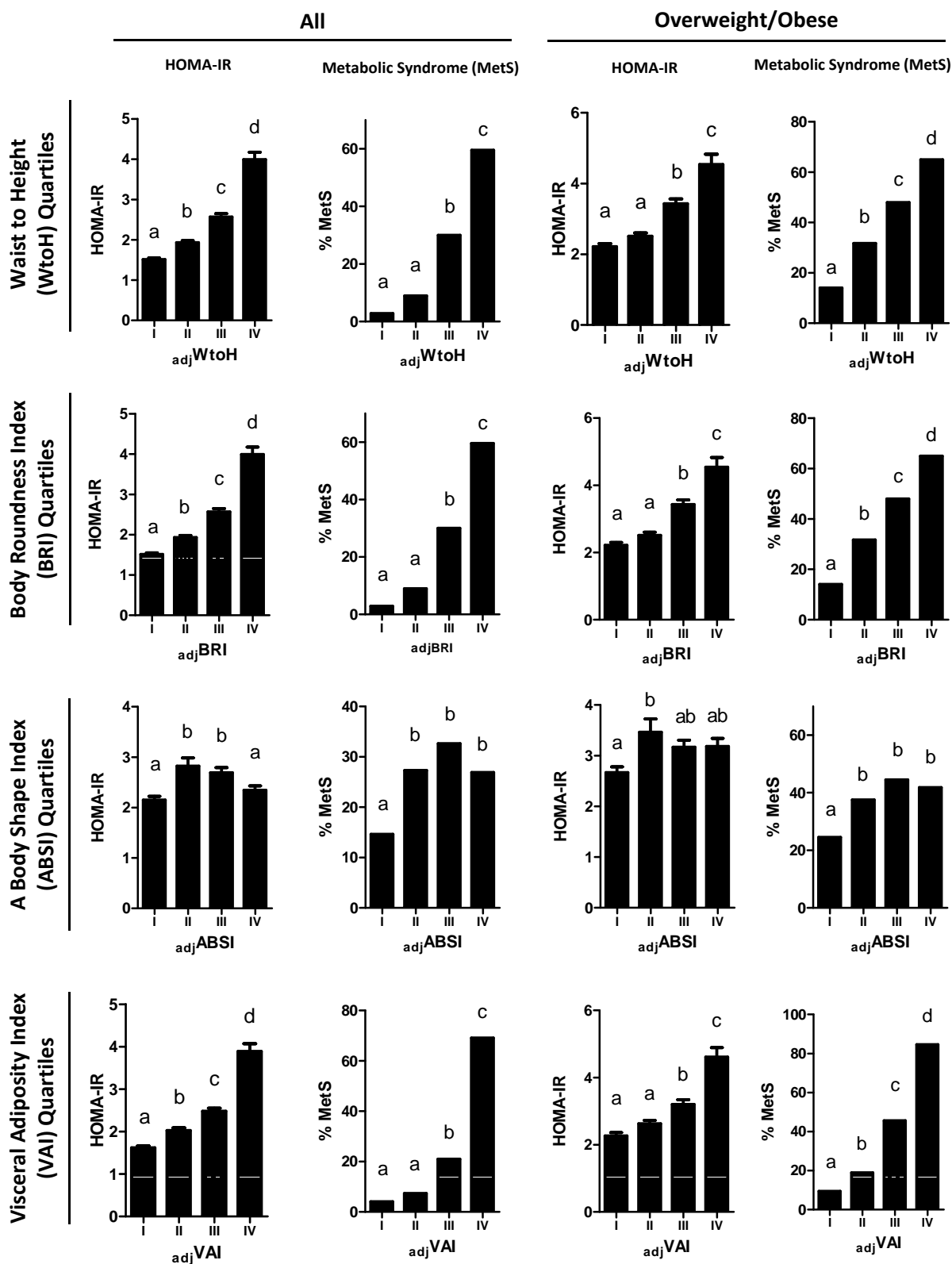
|  |  | **Lean** | | | |
|---|---|---|---|---|---|
| Basal | | Basal HOMA-IR | | | |
|  | Model | B | SE | t | p |
| **BMI** | 1 | 0.094 | 0.015 | 6.200 | <0.001 |
|  | 2a | 0.078 | 0.015 | 5.163 | <0.001 |
|  | 2b | 0.077 | 0.015 | 5.278 | <0.001 |
| **WC** | 1 | 0.023 | 0.003 | 6.636 | <0.001 |
|  | 2a | 0.020 | 0.003 | 5.725 | <0.001 |
|  | 2b | 0.018 | 0.003 | 5.414 | <0.001 |
| **WtoH** | 1 | 3.673 | 0.571 | 6.434 | <0.001 |
|  | 2a | 3.069 | 0.564 | 5.437 | <0.001 |
|  | 2b | 3.069 | 0.564 | 5.437 | <0.001 |
| **BRI** | 1 | 0.193 | 0.030 | 6.397 | <0.001 |
|  | 2a | 0.161 | 0.030 | 5.382 | <0.001 |
|  | 2b | 0.161 | 0.030 | 5.382 | <0.001 |
| **ABSI** | 1 | 1.377 | 0.413 | 3.333 | <0.001 |
|  | 2a | 1.176 | 0.402 | 2.927 | 0.004 |
|  | 2b | 0.995 | 0.391 | 2.547 | 0.011 |
| **VAI** | 1 | 0.313 | 0.035 | 8.986 | <0.001 |
|  | 2a | 0.427 | 0.077 | 5.520 | <0.001 |
|  | 2b | 0.427 | 0.077 | 5.520 | <0.001 |
|  |  | Basal Metabolic Syndrome | | | |
|  |  | B | SE | z | p |
| **BMI** | 1 | 0.276 | 0.107 | 6.658 | 0.010 |
|  | 2a | 0.086 | 0.119 | 0.520 | 0.471 |
|  | 2b | 0.140 | 0.148 | 0.900 | 0.343 |
| **WC** | 1 | 0.132 | 0.024 | 31.150 | <0.001 |
|  | 2a | 0.170 | 0.038 | 19.503 | <0.001 |
|  | 2b | 0.116 | 0.026 | 19.303 | <0.001 |
| **WtoH** | 1 | 20.187 | 3.726 | 29.355 | <0.001 |
|  | 2a | 17.243 | 4.178 | 17.036 | <0.001 |
|  | 2b | 24.009 | 6.045 | 15.774 | <0.001 |
| **BRI** | 1 | 0.988 | 0.178 | 30.747 | <0.001 |
|  | 2a | 0.851 | 0.201 | 18.011 | <0.001 |
|  | 2b | 1.203 | 0.298 | 16.319 | <0.001 |
| **ABSI** | 1 | 12.447 | 2.519 | 24.408 | <0.001 |
|  | 2a | 12.466 | 2.825 | 19.473 | <0.001 |
|  |  |  |  |  |  |
|  | 2b | 18.140 | 4.167 | 18.954 | <0.001 |
| **VAI** | 1 | 1.179 | 0.170 | 47.997 | <0.001 |
|  | 2a | 1.729 | 0.389 | 19.775 | <0.001 |
|  | 2b | 1.378 | 0.346 | 15.832 | <0.001 |

Data adjustments:
Model 1: Age, Gender
Model 2a: Model 1 + HOMA (not for HOMA), MAP, Triglycerides
Model 2b: Model 1 + Diabetes, Hypertension, Hyperlipidemia

**Supplementary Figure 1.** Levels of basal HOMA-IR insulin resistance index or Metabolic Syndrome (MetS) prevalence in all subjects from the genaral population study cohort (n=1945) and in overweight/obese individuals (n=1140), divided in quartiles of Waist to Height (WtoH), Body Roundness Index (BRI), A Body Shape Index (ABSI) and Visceral Adiposity Index (VAI). WtoH, BRI, ABSI and VAI were adjusted (adj) for gender and age in the whole population. Different letters indicate differences (p<0.05) among quartiles.