

Supplementary Table 1. Handgrip strength (kg) in each age group

| Age (yr) | Male | | | Female | | |
|---------------------|--------------|------------------|------------------|--------------|------------------|------------------|
| | Unweighted N | Dominant arm | Nondominant arm | Unweighted N | Dominant arm | Nondominant arm |
| 30–39 | 1,124 | 43.6 (39.1–48.3) | 41.6 (37.0–46.1) | 1,493 | 25.4 (22.2–28.3) | 23.9 (21.0–26.9) |
| 40–49 | 1,242 | 42.5 (37.9–46.8) | 40.7 (36.7–45.0) | 1,613 | 25.1 (21.9–28.3) | 23.8 (20.9–26.7) |
| 50–59 | 1,321 | 39.7 (35.2–43.8) | 38.3 (33.9–42.1) | 1,676 | 24.4 (21.2–26.9) | 22.7 (19.9–25.6) |
| 60–69 | 1,261 | 36.5 (32.2–40.4) | 35.1 (31.0–38.9) | 1,420 | 22.3 (18.9–25.3) | 20.9 (18.1–23.7) |
| 70–79 | 912 | 31.4 (27.0–35.6) | 30.3 (26.4–34.2) | 1,087 | 18.8 (15.6–22.0) | 18.0 (14.9–20.9) |
| <i>P</i> for trend* | | <0.001 | <0.001 | | <0.001 | <0.001 |

Values are presented as median (interquartile range).

*From logistic regression.

Supplementary Table 2. Behavior of the risk of obesity, diabetes mellitus, and metabolic syndrome as the Q of handgrip strength increased

| Variable | OR (95% CI)* | <i>P</i> |
|--------------------|---------------------|----------|
| Male | | |
| Obesity | 1.300 (1.231–1.373) | <0.001 |
| Diabetes mellitus | 0.926 (0.862–0.996) | 0.039 |
| Metabolic syndrome | 1.106 (1.046–1.169) | <0.001 |
| Female | | |
| Obesity | 1.122 (1.062–1.185) | <0.001 |
| Diabetes mellitus | 0.917 (0.854–0.986) | 0.019 |
| Metabolic syndrome | 1.078 (1.021–1.138) | 0.007 |

*Unadjusted odds ratio per one Q of handgrip strength.

Q, quartile; OR, odds ratio; CI, confidence interval.

Supplementary Table 3. The association between low muscle strength and diabetes according to age

| Variable | Multivariable regression analysis* | |
|----------------------------|------------------------------------|----------|
| | OR (95% CI) | <i>P</i> |
| 30–49 yr | | |
| Low muscle strength | 1.524 (1.083–2.143) | 0.016 |
| Family history of diabetes | 2.625 (1.935–3.561) | <0.001 |
| Abdominal obesity | 3.137 (2.277–4.322) | <0.001 |
| Hypertriglyceridemia | 2.032 (1.438–2.872) | <0.001 |
| Low HDL cholesterolemia | 1.472 (1.061–2.041) | 0.021 |
| Hypertension | 1.998 (1.418–2.815) | <0.001 |
| Age | 1.099 (1.068–1.131) | <0.001 |
| Sex (female) | 0.862 (0.623–1.192) | 0.368 |
| 50–69 yr | | |
| Low muscle strength | 1.250 (1.021–1.531) | 0.031 |
| Family history of diabetes | 3.160 (2.614–3.820) | <0.001 |
| Abdominal obesity | 1.660 (1.379–1.999) | <0.001 |
| Hypertriglyceridemia | 1.854 (1.532–2.244) | <0.001 |
| Low HDL cholesterolemia | 1.780 (1.453–2.181) | <0.001 |
| Hypertension | 1.519 (1.264–1.826) | <0.001 |
| Age | 1.071 (1.054–1.088) | <0.001 |
| Sex (female) | 0.546 (0.455–0.663) | <0.001 |
| 70–79 yr | | |
| Low muscle strength | 1.423 (1.050–1.929) | 0.023 |
| Family history of diabetes | 3.194 (2.268–4.497) | <0.001 |
| Abdominal obesity | 1.305 (1.005–1.693) | 0.045 |
| Hypertriglyceridemia | 1.315 (0.976–1.772) | 0.072 |
| Low HDL cholesterolemia | 1.183 (0.869–1.609) | 0.284 |
| Hypertension | 1.692 (1.294–2.211) | <0.001 |
| Age | 1.023 (0.973–1.076) | 0.370 |
| Sex (female) | 0.845 (0.637–1.121) | 0.243 |

*Age, sex, muscle strength, family history of diabetes, abdominal obesity, hypertriglyceridemia, low HDL cholesterolemia, and hypertension were included in the multivariable regression analysis.

OR, odds ratio; CI, confidence interval; HDL, high-density lipoprotein.

Supplementary Table 4. OR for diabetes mellitus in the stratified analysis according to BMI in those without obesity

| Variable | BMI < 23 kg/m ² (unweighted n = 5,986) | | BMI 23–24.9 kg/m ² (unweighted n = 3,566) | |
|----------------------------|---|----------|--|----------|
| | OR (95% CI)* | <i>P</i> | OR (95% CI)* | <i>P</i> |
| Low muscle strength | 1.910 (1.434–2.543) | <0.001 | 1.172 (0.867–1.586) | 0.301 |
| Family history of diabetes | 3.677 (2.658–5.088) | <0.001 | 3.676 (2.770–4.879) | <0.001 |
| Abdominal obesity | 2.028 (1.112–3.699) | 0.021 | 1.094 (0.792–1.512) | 0.585 |
| Hypertriglyceridemia | 1.734 (1.252–2.401) | 0.001 | 2.400 (1.796–3.207) | <0.001 |
| Low HDL cholesterolemia | 1.607 (1.174–2.201) | 0.003 | 1.416 (1.046–1.919) | 0.025 |
| Hypertension | 1.571 (1.177–2.097) | 0.002 | 1.625 (1.214–2.177) | 0.001 |
| Age | 1.081 (1.071–1.091) | <0.001 | 1.075 (1.063–1.088) | <0.001 |
| Sex (female) | 0.434 (0.321–0.586) | <0.001 | 0.802 (0.598–1.076) | 0.140 |

*Age, sex, muscle strength, family history of diabetes, abdominal obesity, hypertriglyceridemia, low HDL cholesterolemia, and hypertension were included in the multivariable regression analysis.

BMI, body mass index; OR, odds ratio; CI, confidence interval; HDL, high-density lipoprotein.