|                        | Overall (n=2,256) | Lowest (n=752) | Middle (n=750) | Highest (n=754) | Missing, n (%) | Overall (n=2,996) | Lowest (n=1,013) | Middle (n=983) | Highest (n=1,000) | Missing, n (%) |
|------------------------|-------------------|----------------|----------------|-----------------|---------------|-------------------|-------------------|----------------|-------------------|---------------|
| Age                    | [63.0] (14.0)     | [63.0] (15.0)  | [63.0] (14.0)  | [63.0] (14.0)   | -             | [57.0] (14.0)     | [66.0] (12.0)     | [60.0] (12.0)   | [60.0] (11.0)     | -             |
| Knee extensor muscle strength | Nm/kg [0.62] (0.64) | [0.55] (0.62) | [0.55] (0.62) | [0.45] (0.45)   | -             | [0.41] (0.41)     | [0.41] (0.47)     | -             | -                 | -             |
| Cardiorespiratory fitness | w/kg [0.66] (0.48) | [0.46] (0.51) | [0.46] (0.51) | [0.52] (0.52)   | -             | [0.28] (0.16)     | [0.16] (0.33)     | -             | -                 | -             |
| Height                 | cm [167.5] (7.9)  | [167.5] (8.1)  | [167.5] (7.7)  | [167.5] (7.8)   | -             | [155.1] (7.4)     | [154.1] (8.0)     | [155.4] (7.4)   | [156.2] (7.3)     | -             |
| Body weight            | kg [64.2] (11.5)  | [67.4] (13.1)  | [64.8] (11.2)  | [61.6] (9.9)    | -             | [53.4] (10.9)     | [54.3] (13.5)     | [53.3] (12.9)   | [51.0] (8.9)      | -             |
| Body mass index        | kg/m² [22.9] (3.4) | [23.9] (3.8)   | [23.1] (3.3)   | [22.0] (2.7)    | -             | [22.2] (4.0)      | [23.1] (5.0)      | [22.1] (4.4)    | [20.7] (3.4)      | -             |
| Blood glucose          | mg/dL [103.0] (14.0) | [107.0] (17.0) | [103.0] (13.0) | [101.0] (11.5)  | (0.9)         | [96.0] (12.0)     | [102.0] (15.0)    | [99.0] (12.0)   | [96.0] (12.0)     | (0.9)         |
| Total cholesterol      | mg/dL [212.0] (42.0) | [214.0] (44.0) | [213.0] (41.0) | [211.4] (29.6)  | (0.9)         | [224.0] (45.0)    | [231.0] (48.0)    | [230.3] (34.3)  | [242.0] (44.0)    | (0.9)         |
| HDL cholesterol        | mg/dL [57.0] (21.0) | [53.0] (18.0)  | [56.0] (19.0)  | [63.0] (23.0)   | (0.9)         | [67.0] (23.0)     | [63.0] (23.0)     | [65.0] (20.0)   | [69.0] (23.0)     | (0.9)         |
| LDL cholesterol        | mg/dL [120.0] (37.0) | [123.0] (39.0) | [121.6] (39.0) | [115.8] (26.4)  | (0.9)         | [135.0] (39.0)    | [131.0] (41.0)    | [129.0] (39.0)  | [119.0] (38.0)    | (0.9)         |
| Triglyceride           | mg/dL [94.0] (64.5) | [109.0] (76.3) | [99.0] (68.5)  | [78.0] (53.0)   | (0.9)         | [82.0] (51.0)     | [95.0] (58.0)     | [86.0] (52.0)   | [69.0] (38.0)     | (0.9)         |
| Alkaline phosphatase   | IU/mL [201.0] (70.0) | [205.0] (80.0) | [202.0] (69.8) | [195.0] (65.0)  | (5.6)         | [164.0] (77.0)    | [232.0] (81.0)    | [222.0] (82.0)  | [204.0] (86.3)    | (14.5)        |
| Uric acid              | mg/dL [5.8] (1.7)  | [6.0] (1.5)    | [5.8] (1.5)    | [5.4] (1.6)     | (0.9)         | [4.2] (1.3)       | [4.8] (1.5)       | [4.6] (1.2)     | [4.3] (1.3)       | (0.9)         |
Data were presented as median [interquartile ranges], mean (standard deviation) and number (percentage) otherwise specified.

|                          | Systolic blood pressure | Diastolic blood pressure | Menopause | Smoking status | Drinking habits | OSI | < 70% YAM | < 80% YAM |
|--------------------------|-------------------------|--------------------------|-----------|----------------|----------------|-----|-----------|-----------|
|                          | mmHg                    | mmHg                     | n (%)     | n (%)          | n (%)          | ×10⁶ | n (%)     | n (%)     |
|                          | 120.0                   | 120.0                    | 168       | (10.6)         | 821            | 2.87 | 23        | 244       |
|                          | [120.0]                 | [18.0]                   | [120.0]   | (11.6)         | (6.2)          | [0.44] | (1.0)     | (10.8)    |
|                          | 120.0                   | [14.0]                   | 70        | (11.4)         | 536            | 2.83 | 12        | 106       |
|                          | [14.0]                  | 1 (0.0)                  | 70        | (11.4)         | (5.2)          | [0.41] | (1.0)     | (14.1)    |
|                          | 119.0                   | [120.0]                  | 70        | (10.1)         | 540            | 2.88 | 7         | 106       |
|                          | [18.0]                  | [18.0]                   | 70        | (10.1)         | (5.0)          | [0.47] | (1.0)     | (10.9)    |
|                          | 122.0                   | 1 (0.0)                  | 70        | (10.1)         | 516            | 2.92 | 4         | 527       |
|                          | [120.0]                 | [14.0]                   | 70        | (10.1)         | (5.0)          | [0.38] | (0.5)     | (7.4)     |
|                          | 120.0                   | [20.0]                   | 68        | (0.0)          | 3              | 2.47 | 30        | 527       |
|                          | [14.0]                  | [14.0]                   | 68        | (0.0)          | (0.1)          | [0.36] | (1.3)     | (17.6)    |
|                          | 118.0                   | [20.0]                   | 62        | (0.0)          | 16             | 2.43 | 13        | 527       |
|                          | [20.0]                  | [14.0]                   | 62        | (0.0)          | (0.6)          | [0.3]  | 11        | 527       |
|                          | 110.0                   | [20.0]                   | 116       | (0.0)          | 6              | 2.48 | 6         | 182       |
|                          | [20.0]                  | [14.0]                   | 116       | (0.0)          | (0.6)          | [0.4]  | 6         | 182       |

HDL, high-density lipoprotein; LDL, low-density lipoprotein cholesterol; OSI, osteo-sono assessment index; YAM, young-adult mean.
| Variables          | Units      | Men |                      | Women |                      | P value | Men |                      | Women |                      | P value |
|-------------------|------------|-----|----------------------|-------|----------------------|---------|-----|----------------------|-------|----------------------|---------|
|                   | Participant| Frequency | Prevalence\(^a\) | Odds ratio (95% CI) | P value | Participant | Frequency | Prevalence\(^a\) | Odds ratio (95% CI) | P value |
| Age               | Years      | 3,731 | 45 | 12.1 | 1.08 (1.04–1.12) | <0.001 | 5,098 | 49 | 9.6 | 1.17 (1.12–1.21) | <0.001 |
|                   | No         | 3,153 | 32 | 10.1 | 1.00 (reference) | <0.001 | 4,844 | 48 | 9.9 | 1.00 (reference) | 0.377 |
|                   | Yes        | 578   | 13 | 22.5 | 2.24 (1.61–3.13) | <0.001 | 254   | 1  | 3.9 | 0.41 (0.06–2.98) | 0.027 |
| Smoking status    |            |       |     |      |                      |         |       |     |      |                      |         |
|                   | No         | 1,180 | 17 | 14.4 | 1.00 (reference) | 0.373  | 3,674 | 43 | 11.7 | 1.00 (reference) | 0.931 |
|                   | Yes        | 2,551 | 28 | 11.0 | 0.76 (0.43–1.35) |         | 1,424 | 6  | 4.2  | 0.38 (0.16–0.90) |         |
|                   | <18.5      | 109   | 12 | 110.1| 10.69 (7.43–15.39)|         | 448   | 16 | 36.1 | 4.61 (2.48–8.56) |         |
| Body mass index   | 18.5–25.0  | 2,704 | 31 | 11.4 | 1.00 (reference) | 0.206  | 3,602 | 29 | 8.1   | 1.00 (reference) | 0.931 |
|                   | ≥25.0      | 908   | 2  | 2.2  | 0.19 (0.09–0.40) |         | 1,053 | 4  | 3.8  | 0.47 (0.17–1.34) |         |
|                   | No         | –     | –  | –    | –                  |         | 1,039 | 0  | 0    | –                  |         |
|                   | Yes        | –     | –  | –    | –                  |         | 4,060 | 49 | 12.1 | –                  |         |
| Menopause         |            |       |     |      |                      |         |       |     |      |                      |         |
|                   | No         | –     | –  | –    | –                  |         | 1,039 | 0  | 0    | –                  |         |
|                   | Yes        | –     | –  | –    | –                  |         | 4,060 | 49 | 12.1 | –                  |         |
| Knee extensor     | Lowest     | 1,245 | 26 | 20.9 | 1.00 (reference) |         | 1,699 | 28 | 16.5 | 1.00 (reference) |         |
| muscle strength   | Middle     | 1,243 | 12 | 9.7  | 0.46 (0.23–0.91) | <0.001 | 1,700 | 14 | 8.2  | 0.50 (0.26–0.95) | <0.001 |
|                   | Highest    | 1,243 | 7  | 5.6  | 0.27 (0.16–0.61) | <0.001 | 1,699 | 7  | 4.1  | 0.25 (0.11–0.57) |         |
| Cardiorespiratory | Lowest     | 1,243 | 24 | 19.3 | 1.00 (reference) |         | 1,699 | 21 | 12.3 | 1.00 (reference) |         |
| fitness           | Middle     | 1,245 | 14 | 11.2 | 0.58 (0.23–1.48) | 0.045  | 1,698 | 17 | 10.0 | 0.81 (0.37–1.79) | 0.238 |
|                   | Highest    | 1,243 | 7  | 5.6  | 0.33 (0.11–1.02) |         | 1,701 | 11 | 6.5  | 0.53 (0.18–1.58) |         |

CI, confidence interval.
\(^a\) Prevalence per 1,000 persons.
**Table 3.** Associations of knee extensor muscle strength or cardiorespiratory fitness with low bone stiffness (YAM70%)

|                    | Knee extensor muscle strength | Cardiorespiratory fitness |  
|-------------------|-------------------------------|---------------------------|
|                   | Lowest | Middle (95% confidence interval) | Highest |  
|                   |        |                                 |          |  
|                   |        |                                 |          |  
| Men               |        |                                 |          |  
| Age adjusted      | 1.00 (reference) | 0.50 (0.25–1.00) | 0.32 (0.14–0.74) | 0.004 |
| Multivariable adjusted<sup>a</sup> | 1.00 (reference) | 0.47 (0.22–0.98) | 0.22 (0.14–0.35) | <0.001 |
| Mutual adjusted<sup>b</sup> | 1.00 (reference) | 0.47 (0.23–0.97) | 0.23 (0.01–0.55) | <0.001 |
| Women             |        |                                 |          |  
| Age adjusted      | 1.00 (reference) | 0.83 (0.43–1.61) | 0.72 (0.30–1.72) | 0.416 |
| Multivariable adjusted<sup>a</sup> | 1.00 (reference) | 0.61 (0.31–1.20) | 0.41 (0.18–0.95) | 0.035 |
| Mutual adjusted<sup>b</sup> | 1.00 (reference) | 0.61 (0.31–1.20) | 0.42 (0.17–1.02) | 0.037 |
| Post-menopausal   |        |                                 |          |  
| Age adjusted      | 1.00 (reference) | 0.83 (0.59–1.18) | 0.72 (0.30–1.72) | 0.420 |
| Multivariable adjusted<sup>a</sup> | 1.00 (reference) | 0.61 (0.32–1.19) | 0.41 (0.18–0.97) | 0.035 |
| Mutual adjusted<sup>b</sup> | 1.00 (reference) | 0.61 (0.31–1.20) | 0.42 (0.17–1.02) | 0.037 |

Values were expressed as odds ratio (95% confidence interval)

<sup>a</sup> additionally adjusted smoking status, drinking habits, BMI, systolic blood pressure, and menopause (Women only).

<sup>b</sup> mutually adjusted cardiorespiratory fitness or knee extensor muscle strength plus the variables above.
**Table 4.** Interacting association of knee extensor muscle strength and cardiorespiratory fitness with low bone stiffness (YAM70%)

|                          | Participant | Frequency | Prevalence | Odds ratio (95% CI) | Combined Odds ratio (95% CI) | \( P \) for interaction |
|--------------------------|-------------|-----------|------------|---------------------|-----------------------------|-------------------------|
| **Men**                  |             |           |            |                     |                             | 0.985                   |
| Lowest cardiorespiratory fitness |             |           |            |                     |                             |                         |
| Lowest knee extensor muscle strength | 719 | 16 | 22.3 | 1.00 (reference) | 1.00 (reference) |                         |
| Middle knee extensor muscle strength | 688 | 8 | 11.6 | 0.55 (0.45–0.66) | 0.55 (0.21–1.42) |                         |
| Highest knee extensor muscle strength | 484 | 3 | 6.2 | 0.22 (0.16–0.30) | 0.21 (0.05–0.91) |                         |
| Highest cardiorespiratory fitness |             |           |            |                     |                             |                         |
| Lowest knee extensor muscle strength | 551 | 10 | 18.1 | 1.00 (reference) | 0.63 (0.20–2.00) |                         |
| Middle knee extensor muscle strength | 566 | 4 | 7.1 | 0.37 (0.26–0.44) | 0.22 (0.06–0.82) |                         |
| Highest knee extensor muscle strength | 766 | 4 | 5.2 | 0.25 (0.20–0.33) | 0.16 (0.05–0.54) |                         |
| **Women**                |             |           |            |                     |                             | 0.521                   |
| Lowest cardiorespiratory fitness |             |           |            |                     |                             |                         |
| Lowest knee extensor muscle strength | 1,037 | 20 | 19.3 | 1.00 (reference) | 1.00 (reference) |                         |
| Middle knee extensor muscle strength | 902 | 8 | 8.9 | 0.47 (0.39–0.57) | 0.46 (0.18–1.17) |                         |
| Highest knee extensor muscle strength | 612 | 2 | 3.3 | 0.37 (0.28–0.49) | 0.35 (0.08–1.48) |                         |
| Highest cardiorespiratory fitness |             |           |            |                     |                             |                         |
| Lowest knee extensor muscle strength | 663 | 9 | 13.6 | 1.00 (reference) | 0.85 (0.25–2.94) |                         |
| Middle knee extensor muscle strength | 798 | 6 | 7.5 | 0.95 (0.75–1.21) | 0.81 (0.27–2.45) |                         |
| Highest knee extensor muscle strength | 1,088 | 4 | 3.7 | 0.48 (0.36–0.63) | 0.42 (0.11–1.63) |                         |
| Post-menopausal          |             |           |            |                     |                             | 0.521                   |
| Lowest cardiorespiratory fitness | Lowest knee extensor muscle strength | 958 | 11 | 11.5 | 1.00 (reference) | 1.00 (reference) |
|----------------------------------|-------------------------------------|-----|----|------|----------------|----------------|
| Middle knee extensor muscle strength | 765 | 6 | 7.8 | 0.48 (0.19–1.22) | 0.47 (0.18–1.18) |
| Highest knee extensor muscle strength | 441 | 2 | 4.5 | 0.36 (0.08–1.57) | 0.34 (0.08–1.47) |
| Highest cardiorespiratory fitness | Lowest knee extensor muscle strength | 592 | 2 | 3.4 | 1.00 (reference) | 0.81 (0.23–2.78) |
| Middle knee extensor muscle strength | 603 | 5 | 8.3 | 1.01 (0.27–3.78) | 0.82 (0.27–2.47) |
| Highest knee extensor muscle strength | 701 | 3 | 4.3 | 0.49 (0.12–2.09) | 0.42 (0.11–1.64) |

CI, confidence interval.

a Prevalence per 1,000 persons.

b Adjusted for age, smoking status, drinking habits, body mass index, and menopause (Women only).

c Using lowest cardiorespiratory fitness and lowest knee extensor muscle strength as reference.
**Table 5.** Univariate associations of each covariate and two main exposure variables with low bone stiffness (complete case)

| Variables            | Units | Men | Frequency | Prevalence | Odds ratio (95% CI) | P value | Women | Frequency | Prevalence | Odds ratio (95% CI) | P value |
|----------------------|-------|-----|-----------|------------|---------------------|---------|--------|-----------|------------|---------------------|---------|
| Age                  | Years |     | 2,235     | 241        | 107.8               | 1.01 (0.99–1.03) | 0.070  | 2,890     | 499        | 172.7               | 1.10 (1.08–1.11) | <0.001 |
| Smoking status       |       |     | No        | 1,987      | 197                 | 99.1    | 1.00 (reference) | <0.001 | 2,787     | 480        | 172.2               | 1.00 (reference) | 0.747 |
|                      |       | Yes | 248       | 44         | 177.4               | 1.96 (1.37–2.80) | <0.001 | 103       | 19         | 184.5               | 1.09 (0.65–1.81) | <0.001 |
| Drinking habits      |       |     | No        | 725        | 94                  | 129.7   | 1.00 (reference) | 0.022 | 1,998     | 382        | 191.2               | 1.00 (reference) | <0.001 |
|                      |       | Yes | 1,510     | 147        | 97.4                | 0.72 (0.55–0.95) | 0.022 | 892       | 117        | 131.2               | 0.64 (0.51–0.80) | <0.001 |
| Body mass index      | 18.5–25.0 |     | 1,641     | 179        | 109.1               | 1.00 (reference) | 0.566 | 2,000     | 354        | 177.0               | 1.00 (reference) | 0.004 |
|                      | ≥25.0 |     | 520       | 51         | 98.1                | 0.88 (0.64–1.23) | 0.566 | 596       | 64         | 107.4               | 0.56 (0.42–0.74) | <0.001 |
| Menopause            |       |     | No        | -          | -                   | -       | -      | 498       | 10         | 20.1                | 1.00 (reference) | <0.001 |
|                      |       | Yes | -         | -          | -                   | -       | -      | 2,382     | 489        | 205.3               | 12.86 (6.83–24.25) | <0.001 |
| Knee extensor muscle strength |     |     | Lowest | 743       | 113                 | 152.1   | 1.00 (reference) | <0.001 | 958       | 210        | 219.2               | 1.00 (reference) | <0.001 |
|                      |       |     | Middle   | 748       | 72                  | 96.3    | 0.59 (0.43–0.81) | <0.001 | 973       | 174        | 178.8               | 0.78 (0.62–0.97) | <0.001 |
|                      |       |     | Highest  | 744       | 56                  | 75.3    | 0.45 (0.32–0.64) | <0.001 | 959       | 115        | 119.9               | 0.49 (0.38–0.62) | <0.001 |
|                      |       |     | Lowest   | 755       | 102                 | 135.1   | 1.00 (reference) | <0.001 | 981       | 207        | 211.0               | 1.00 (reference) | <0.001 |
| Cardiorespiratory fitness |     |     | Middle   | 740       | 86                  | 116.2   | 0.84 (0.62–1.14) | <0.001 | 972       | 173        | 178.0               | 0.81 (0.65–1.01) | 0.231 |
|                      |       |     | Highest  | 740       | 53                  | 71.6    | 0.49 (0.35–0.70) | <0.001 | 937       | 119        | 127.0               | 0.54 (0.43–0.70) | <0.001 |

CI, confidence interval.

a Prevalence per 1,000 persons.
**Table 6.** Associations of knee extensor muscle strength or cardiorespiratory fitness with low bone stiffness (complete case)

|                          | Knee extensor muscle strength |                        |   |   |   | P for trend |
|--------------------------|------------------------------|------------------------|---|---|---|-------------|
|                          | Lowest                       | Middle                 | Highest  |          |          |            |
| **Men**                  |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 0.58 (0.41–0.80)       | 0.43 (0.29–0.63) | <0.001   |          |            |
| Multivariable adjusted†  | 1.00 (reference)             | 0.57 (0.40–0.80)       | 0.39 (0.26–0.59) | <0.001   |          |            |
| Mutual adjusted‡         | 1.00 (reference)             | 0.59 (0.42–0.83)       | 0.41 (0.27–0.62) | <0.001   |          |            |
| **Women**                |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 1.09 (0.86–1.38)       | 1.00 (0.76–1.32) | 0.911    |          |            |
| Multivariable adjusted†  | 1.00 (reference)             | 0.89 (0.69–1.13)       | 0.73 (0.55–0.97) | 0.034    |          |            |
| Mutual adjusted‡         | 1.00 (reference)             | 0.99 (0.69–1.13)       | 0.74 (0.55–0.99) | 0.046    |          |            |
| **Pre-menopausal**       |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 1.78 (0.08–39.66)      | 4.26 (0.22–81.26) | 0.199    |          |            |
| Multivariable adjusted†  | 1.00 (reference)             | 0.86 (0.04–20.80)      | 0.92 (0.04–20.05) | 0.998    |          |            |
| Mutual adjusted‡         | 1.00 (reference)             | 0.86 (0.04–19.94)      | 0.81 (0.04–19.74) | 0.981    |          |            |
| **Post-menopausal**      |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 1.08 (0.85–1.37)       | 0.99 (0.75–1.30) | 0.984    |          |            |
| Multivariable adjusted†  | 1.00 (reference)             | 0.89 (0.70–1.14)       | 0.71 (0.53–0.96) | 0.027    |          |            |
| Mutual adjusted‡         | 1.00 (reference)             | 0.89 (0.70–1.14)       | 0.72 (0.54–0.97) | 0.034    |          |            |

|                          | Cardiorespiratory fitness    |                        |   |   |   | P for trend |
|--------------------------|------------------------------|------------------------|---|---|---|-------------|
|                          | Lowest                       | Middle                 | Highest  |          |          |            |
| **Men**                  |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 0.84 (0.61–1.16)       | 0.49 (0.33–0.73) | <0.001   |          |            |
| Multivariable adjusteda  | 1.00 (reference)             | 0.75 (0.54–1.05)       | 0.40 (0.26–0.60) | <0.001   |          |            |
| Mutual adjustedb         | 1.00 (reference)             | 0.78 (0.56–1.08)       | 0.42 (0.27–0.63) | <0.001   |          |            |
| **Women**                |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 1.37 (1.07–1.75)       | 1.33 (1.00–1.77) | 0.032    |          |            |
| Multivariable adjusteda  | 1.00 (reference)             | 1.13 (0.88–1.46)       | 0.93 (0.69–1.26) | 0.974    |          |            |
| Mutual adjustedb         | 1.00 (reference)             | 1.14 (0.89–1.47)       | 0.96 (0.71–1.31) | 0.911    |          |            |
| **Pre-menopausal**       |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 3.10 (0.41–23.31)      | 1.13 (0.13–10.02) | 0.791    |          |            |
| Multivariable adjusteda  | 1.00 (reference)             | 2.48 (0.33–18.50)      | 0.45 (0.06–3.72) | 0.218    |          |            |
| Mutual adjustedb         | 1.00 (reference)             | 2.52 (0.33–19.25)      | 0.47 (0.06–3.96) | 0.232    |          |            |
| **Post-menopausal**      |                              |                        |          |          |          |            |
| Age adjusted             | 1.00 (reference)             | 1.27 (0.99–1.62)       | 1.31 (0.98–1.74) | 0.051    |          |            |
| Multivariable adjusteda  | 1.00 (reference)             | 1.12 (0.87–1.45)       | 0.96 (0.71–1.31) | 0.006    |          |            |
| Mutual adjustedb         | 1.00 (reference)             | 1.13 (0.87–1.46)       | 1.00 (0.74–1.36) | 0.911    |          |            |

Values were expressed as odds ratio (95% confidence interval)

a additionally adjusted smoking status, drinking habits, BMI, and menopause (Women only).

b mutually adjusted cardiorespiratory fitness or knee extensor muscle strength plus the variables listed above.
| Sex          | Participant | Frequency | Prevalence | Odds ratio (95% CI) | Combined Odds ratio (95% CI) | P for interaction |
|--------------|-------------|-----------|------------|---------------------|-------------------------------|------------------|
| **Men**      |             |           |            |                     |                               | **0.489**        |
| Lowest       |             |           |            |                     |                               |                  |
| Lowest       |             |           |            |                     |                               |                  |
| Knee extensor muscle strength |             |           |            |                     |                               |                  |
| Lowest       | 544         | 91        | 167.3      | 1.00 (reference)    | 1.00 (reference)              |                  |
| Middle       | 377         | 41        | 108.8      | 0.46 (0.29–0.71)    | 0.57 (0.37–0.87)              |                  |
| Highest      | 208         | 20        | 96.2       | 0.32 (0.18–0.58)    | 0.39 (0.22–0.68)              |                  |
| Highest      |             |           |            |                     |                               |                  |
| Knee extensor muscle strength |             |           |            |                     |                               |                  |
| Lowest       | 199         | 22        | 110.6      | 1.00 (reference)    | 0.48 (0.28–0.81)              |                  |
| Middle       | 371         | 31        | 83.6       | 0.65 (0.35–1.19)    | 0.31 (0.19–0.52)              |                  |
| Highest      | 536         | 36        | 67.2       | 0.60 (0.31–1.13)    | 0.23 (0.13–0.39)              |                  |
| **Women**    |             |           |            |                     |                               | **0.398**        |
| Lowest       |             |           |            |                     |                               |                  |
| Knee extensor muscle strength |             |           |            |                     |                               |                  |
| Lowest       | 656         | 147       | 224.1      | 1.00 (reference)    | 1.00 (reference)              |                  |
| Middle       | 529         | 107       | 202.3      | 0.81 (0.59–1.10)    | 0.88 (0.65–1.20)              |                  |
| Highest      | 287         | 41        | 142.9      | 0.70 (0.46–1.06)    | 0.78 (0.51–1.18)              |                  |
| Highest      |             |           |            |                     |                               |                  |
| Knee extensor muscle strength |             |           |            |                     |                               |                  |
| Lowest       | 302         | 63        | 208.6      | 1.00 (reference)    | 1.05 (0.73–1.51)              |                  |
| Middle       | 404         | 67        | 165.8      | 0.96 (0.63–1.44)    | 0.93 (0.64–1.34)              |                  |
| Highest      | 672         | 74        | 110.1      | 0.83 (0.54–1.26)    | 0.72 (0.50–1.06)              |                  |
| Post-menopausal |             |           |            |                     |                               | **0.563**        |
| Lowest       |             |           |            |                     |                               |                  |
| Knee extensor muscle strength |             |           |            |                     |                               |                  |
| Lowest       | 618         | 146       | 236.2      | 1.00 (reference)    | 1.00 (reference)              |                  |
| Middle       | 471         | 106       | 225.1      | 0.81 (0.59–1.11)    | 0.89 (0.66–1.21)              |                  |
|                  | Prevalence | Age-adjusted HR | CI              | Adjusted HR | CI              |
|------------------|------------|------------------|-----------------|-------------|-----------------|
| **Highest** knee extensor muscle strength | 223        | 40               | 179.4           | 0.70        | (0.46–1.08)     |
| **Highest** cardiorespiratory fitness |            |                  |                 |             |                 |
| **Lowest** knee extensor muscle strength | 279        | 63               | 225.8           | 1.00 (reference) | 1.06 (0.74–1.53) |
| **Middle** knee extensor muscle strength | 347        | 66               | 190.2           | 0.95 (0.63–1.44) | 0.94 (0.65–1.37) |
| **Highest** knee extensor muscle strength | 444        | 68               | 153.2           | 0.80 (0.52–1.23) | 0.71 (0.48–1.04) |

CI, confidence interval.

a Prevalence per 1,000 persons.

b Adjusted for age, smoking status, drinking habits, body mass index, and menopause (Women only).

c Using lowest cardiorespiratory fitness and lowest knee extensor muscle strength as reference.