**Supplementary material**

**Supplemental Table S1.** Odds ratio (OR) of hypertension and changes in blood pressure by total 25(OH)D concentrations, using two categories (sufficient or not), in pre- and postmenopausal women.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **Total 25(OH)D** **(nmol/L)** | | | | | | | |
| **No. HTN**  **/ No. participants** | **Fully adjusted OR** | |  | **SBP (mmHg)** | | **DBP (mmHg)** | |
|  | | **OR** | **95 %CI** |  | **ß** | **95 %CI** | **ß** | **95 %CI** |
| **Premenopausal women** | |  |  |  |  |  |  |  |
| <50 (insufficient & deficient) | 162/824 | 1 | Ref. |  | 0 | Ref. | 0 | Ref. |
| ≥50 (sufficient) | 166/1274 | 0.54 | 0.36, 0.79\* |  | -2.26 | -4.03, -0.48**\*** | -1.71 | -3.34, -0.09**\*** |
| **Postmenopausal women** | |  |  |  |  |  |  |  |
| <50 (insufficient & deficient) | 470/700 | 1 | Ref. |  | 0 | Ref. | 0 | Ref. |
| ≥50 (sufficient) | 1003/1598 | 0.96 | 0.75, 1.23 |  | -1.70 | -4.85, 1.44 | 1.35 | -0.39, 3.09 |
| **P-value for interaction** |  | 0.016 | |  | 0.728 | | 0.012 | |

\*\*\* P< 0.001, \*\* P< 0.01, \* P< 0.05, † P< 0.1 compared with reference group (vitamin concentrations <50 nmol/L).

Fully adjusted model was for age, race/ethnicity, education, season of examination, physical activity, alcohol consumption, smoking status, and dietary covariates (intakes of total energy, potassium, calcium, magnesium, and sodium).

**Supplemental Table S2.** Odds ratio (OR) of hypertension by total 25(OH)D and 25(OH)D3 concentrations, using the US Endocrine Society classification, in pre- and postmenopausal women.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **Total 25(OH)D** **(nmol/L)** | | | | |  | **25(OH)D3** **(nmol/L)** | | | | |
| **No. HTN**  **/ No. participants** | **Model A** | | **Model B** | |  | **No. HTN**  **/ No. participants** | **Model A** | | **Model B** | |
|  | | **OR** | **95 %CI** | **OR** | **95 %CI** |  |  | **OR** | **95 %CI** | **OR** | **95 %CI** |
| **Premenopausal women (n=2098)** | |  |  |  |  |  |  |  |  |  |  |
| <50 (insufficient & deficient) | 162/824 | 1 | Ref. | 1 | Ref. |  | 171/897 | 1 | Ref. | 1 | Ref. |
| 50~74.99 (suboptimal) | 95/715 | 0.56 | 0.40, 0.79\*\* | 0.58 | 0.40, 0.82\*\* |  | 95/694 | 0.57 | 0.41, 0.79**\*\*\*** | 0.59 | 0.42, 0.83**\*\*** |
| ≥75 (sufficient) | 71/559 | 0.45 | 0.25, 0.80\*\* | 0.48 | 0.27, 0.87\* |  | 62/507 | 0.50 | 0.27, 0.90**\*** | 0.54 | 0.30, 0.96**\*** |
| P-value for trend |  | 0.008 | | 0.017 | |  |  | 0.019 | | 0.040 | |
| **Postmenopausal women (n=2298)** | |  |  |  |  |  |  |  |  |  |  |
| <50 (insufficient & deficient) | 470/700 | 1 | Ref. | 1 | Ref. |  | 588/871 | 1 | Ref. | 1 | Ref. |
| 50~74.99 (suboptimal) | 501/776 | 1.03 | 0.75, 1.42 | 1.10 | 0.80, 1.53 |  | 484/760 | 0.96 | 0.76, 1.22 | 1.02 | 0.79, 1.30 |
| ≥75 (sufficient) | 502/822 | 0.79 | 0.62, 1.00† | 0.85 | 0.66, 1.09 |  | 401/667 | 0.76 | 0.61, 0.97**\*** | 0.81 | 0.64, 1.01† |
| P-value for trend |  | 0.031 | | 0.106 | |  |  | 0.009 | | 0.050 | |
| **P-value for interaction** |  | 0.102 | | 0.132 | |  |  | 0.141 | | 0.193 | |

\*\*\* P< 0.001, \*\* P< 0.01, \* P< 0.05, † P< 0.1 compared with reference group (vitamin concentrations <50 nmol/L).

Model A was for age, race/ethnicity, education, season of examination, physical activity, alcohol consumption, smoking status.

Model B: model A + further adjusted for dietary covariates (intakes of total energy, potassium, calcium, magnesium, and sodium).

**Supplemental Table S3.** Physical conditions adjusted odds ratio (OR) of hypertension in pre- and postmenopausal women.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **No. HTN**  **/ No. participants** | **Total 25(OH)D**  **(nmol/L)** | |  | **No. HTN**  **/ No. participants** | **25(OH)D3 (nmol/L)** | |
| **Premenopausal women (n=2098)** | |  |  |  |  |  |  |
| <30 (deficient) | 49/238 | 1 | Ref. |  | 64/292 | 1 | Ref. |
| 30~49.99 (insufficient) | 113/586 | 1.43 | 0.88, 1.48 |  | 107/605 | 1.15 | 0.77, 1.71 |
| ≥50 (sufficient) | 166/1274 | 0.91 | 0.56, 1.48 |  | 157/1201 | 0.80 | 0.47, 1.35 |
| P-value for trend |  | 0.180 | |  |  | 0.205 | |
| **Postmenopausal women (n=2298)** | |  |  |  |  |  |  |
| <30 (deficient) | 142/195 | 1 | Ref. |  | 223/309 | 1 | Ref. |
| 30~49.99 (insufficient) | 328/505 | 0.82 | 0.52, 1.31 |  | 365/562 | 0.94 | 0.59, 1.49 |
| ≥50 (sufficient) | 1003/1598 | 1.00 | 0.64, 1.56 |  | 885/1427 | 1.06 | 0.76, 1.46 |
| P-value for trend |  | 0.456 | |  |  | 0.447 | |
| **P-value for interaction** |  | 0.120 | |  |  | 0.151 | |

\*\*\* P< 0.001, \*\* P< 0.01, \* P< 0.05, † P< 0.1 compared with reference group (vitamin concentrations <30 nmol/L).

These models were adjusted for age, race/ethnicity, education, season of examination, physical activity, alcohol consumption, smoking status, dietary covariates, height, weight, diabetes, hormone therapy, and use of birth-control pills.

**Supplemental Table S4.** CRP**-**adjusted odds ratio (OR) of hypertension in pre- and postmenopausal women.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Variables** | **No. HTN**  **/ No. participants** | **Total 25(OH)D**1  **(nmol/L)** | |  | **No. HTN**  **/ No. participants** | **25(OH)D3**1  **(nmol/L)** | |
| **Premenopausal women (n=2097)2** | |  |  |  |  |  |  |
| <30 (deficient) | 49/238 | 1 | Ref. |  | 64/291 | 1 | Ref. |
| 30~49.99 (insufficient) | 113/586 | 1.28 | 0.79, 2.06 |  | 107/605 | 1.03 | 0.70, 1.51 |
| ≥50 (sufficient) | 166/1273 | 0.71 | 0.45, 1.14 |  | 157/1201 | 0.62 | 0.37, 1.05† |
| P-value for trend |  | 0.019 | |  |  | 0.028 | |
| **Postmenopausal women (n=2297)2** | |  |  |  |  |  |  |
| <30 (deficient) | 142/195 | 1 | Ref. |  | 223/309 | 1 | Ref. |
| 30~49.99 (insufficient) | 328/505 | 0.69 | 0.45, 1.06 |  | 365/562 | 0.81 | 0.52, 1.25 |
| ≥50 (sufficient) | 1002/1597 | 0.73 | 0.48, 1.12 |  | 884/1426 | 0.80 | 0.58, 1.11 |
| P-value for trend |  | 0.449 | |  |  | 0.201 | |
| **P-value for interaction** | | 0.115 | |  |  | 0.126 | |

\*\*\* P< 0.001, \*\* P< 0.01, \* P< 0.05, † P< 0.1 compared with reference group (vitamin concentrations <30 nmol/L).

**1**These models were adjusted for age, race/ethnicity, education, season of examination, physical activity, alcohol consumption, smoking status, dietary covariates, and serum CRP concentrations.

**2**Data for these analyses (n=4394) excluded women who with missing information on serum CRP concentrations.