Supplementary Material

**Table S1.** Baseline comparison of blood pressure measures, serum 25(OH)D and vitamin D supplementation dose according to age groups

<table>
<thead>
<tr>
<th>Baseline measure</th>
<th>Age Range (yr)</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systolic blood pressure (mmHg)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>116(^d)</td>
<td>12</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>118(^c)</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>125(^b)</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>132(^a)</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>125</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td><strong>Diastolic blood pressure (mmHg)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>73(^d)</td>
<td>9</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>76(^c)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>78(^a)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>77(^b)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>77</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Pulse Pressure (mmHg)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>42(^c)</td>
<td>9</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>43(^c)</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>46(^b)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>54(^a)</td>
<td>15</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>48</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td><strong>Mean Arterial Pressure (mmHg)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>88(^d)</td>
<td>10</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>90(^c)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>94(^b)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>95(^a)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>93</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Serum 25(OH)D (nmol/L)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>84(^bc)</td>
<td>41</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>83(^c)</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>87(^ab)</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>89(^a)</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>87</td>
<td>37</td>
<td></td>
</tr>
<tr>
<td><strong>Vitamin D dose (IU/d)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>1400(^b)</td>
<td>2800</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>1500(^ab)</td>
<td>2700</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>1700(^a)</td>
<td>2600</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>1500(^ab)</td>
<td>2000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>1600</td>
<td>2500</td>
<td></td>
</tr>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>&lt; 35</td>
<td>947</td>
<td>26(^c)</td>
<td>5</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>831</td>
<td>27(^b)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>45-64</td>
<td>3,823</td>
<td>28(^a)</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 65</td>
<td>2,554</td>
<td>28(^a)</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>8,155</td>
<td>27</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

*One-Way ANOVA, different superscripts denote differences using post-hoc Tukey’s test*
### Table S2. Comparison of blood pressure status between baseline and one year (Participants who did not take BP-lowering medication at baseline and follow-up)

<table>
<thead>
<tr>
<th>Baseline Status</th>
<th>Normal</th>
<th>Pre-hypertension</th>
<th>Hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Whole population</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>548 (65)</td>
<td>289 (34)</td>
<td>9 (1.1)</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>378 (36)</td>
<td>607 (59)</td>
<td>53 (5)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>8 (7)</td>
<td>77 (66)</td>
<td>32 (27)</td>
</tr>
<tr>
<td><strong>Age &lt; 34 yr</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>65 (77)</td>
<td>19 (23)</td>
<td>0</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>19 (51)</td>
<td>17 (46)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0</td>
<td>1 (100)</td>
<td>0</td>
</tr>
<tr>
<td><strong>35 – 44 yr</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>55 (81)</td>
<td>12 (18)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>16 (42)</td>
<td>22 (58)</td>
<td>0</td>
</tr>
<tr>
<td>Hypertension</td>
<td>0</td>
<td>4 (57)</td>
<td>3 (43)</td>
</tr>
<tr>
<td><strong>45 – 64 yr</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>312 (68)</td>
<td>142 (31)</td>
<td>4 (1)</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>214 (41)</td>
<td>270 (52)</td>
<td>38 (7)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>3 (5)</td>
<td>39 (64)</td>
<td>19 (31)</td>
</tr>
<tr>
<td><strong>≥ 65 yr</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>116 (49)</td>
<td>116 (49)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>Pre-hypertension</td>
<td>129 (29)</td>
<td>298 (68)</td>
<td>14 (3)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>5 (10)</td>
<td>33 (69)</td>
<td>10 (21)</td>
</tr>
</tbody>
</table>

Chi square test, p<0.001, Data presented as number (% within BP status at baseline)
Table S3. Blood pressure measures changes over time in whole population and after excluding participants on BP-lowering medication after joining the program, according to BP status

<table>
<thead>
<tr>
<th>Parameter</th>
<th>BP status</th>
<th>Whole population (n=8,155)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>P value</td>
<td>N</td>
<td>Mean</td>
<td>SD</td>
<td>P value</td>
<td>#</td>
<td></td>
</tr>
<tr>
<td>Systolic blood pressure change</td>
<td>normotensive</td>
<td>3273</td>
<td>6.0</td>
<td>a</td>
<td>&lt; 0.01</td>
<td>1819</td>
<td>5.7</td>
<td>a</td>
<td>&lt; 0.001</td>
<td>0.58</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pre-hypertensive</td>
<td>4290</td>
<td>-3.8</td>
<td>b</td>
<td></td>
<td>2156</td>
<td>-4.6</td>
<td>b</td>
<td></td>
<td>0.81</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypertensive</td>
<td>592</td>
<td>-12</td>
<td>c</td>
<td></td>
<td>276</td>
<td>-13</td>
<td>c</td>
<td></td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure change</td>
<td>normotensive</td>
<td>3273</td>
<td>2.6</td>
<td>a</td>
<td>&lt; 0.01</td>
<td>1819</td>
<td>2.7</td>
<td>a</td>
<td>&lt; 0.001</td>
<td>0.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pre-hypertensive</td>
<td>4290</td>
<td>-2.0</td>
<td>b</td>
<td></td>
<td>2156</td>
<td>-2.3</td>
<td>b</td>
<td></td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypertensive</td>
<td>592</td>
<td>-10</td>
<td>c</td>
<td></td>
<td>276</td>
<td>-10</td>
<td>c</td>
<td></td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>Pulse Pressure change</td>
<td>normotensive</td>
<td>3273</td>
<td>3.4</td>
<td>a</td>
<td>&lt; 0.01</td>
<td>1819</td>
<td>3.0</td>
<td>a</td>
<td>&lt; 0.001</td>
<td>0.48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pre-hypertensive</td>
<td>4290</td>
<td>-1.9</td>
<td>b</td>
<td></td>
<td>2156</td>
<td>-2.3</td>
<td>b</td>
<td></td>
<td>0.61</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypertensive</td>
<td>592</td>
<td>-1.6</td>
<td>c</td>
<td></td>
<td>276</td>
<td>-3.0</td>
<td>c</td>
<td></td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>Mean Arterial Pressure change</td>
<td>normotensive</td>
<td>3273</td>
<td>3.8</td>
<td>a</td>
<td>&lt; 0.01</td>
<td>1819</td>
<td>3.7</td>
<td>a</td>
<td>&lt; 0.001</td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pre-hypertensive</td>
<td>4290</td>
<td>-2.6</td>
<td>b</td>
<td></td>
<td>2156</td>
<td>-3.1</td>
<td>b</td>
<td></td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypertensive</td>
<td>592</td>
<td>-11</td>
<td>c</td>
<td></td>
<td>276</td>
<td>-11</td>
<td>c</td>
<td></td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Serum 25(OH)D change</td>
<td>normotensive</td>
<td>3273</td>
<td>24</td>
<td>a</td>
<td>&lt; 0.01</td>
<td>1819</td>
<td>23</td>
<td>a</td>
<td>0.01</td>
<td>0.97</td>
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<tr>
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<td>pre-hypertensive</td>
<td>4290</td>
<td>28</td>
<td>a</td>
<td></td>
<td>2156</td>
<td>27</td>
<td>a</td>
<td></td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hypertensive</td>
<td>592</td>
<td>31</td>
<td>a</td>
<td></td>
<td>276</td>
<td>28</td>
<td>a</td>
<td></td>
<td>0.05</td>
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</tbody>
</table>

*One-way ANOVA, different letters show post-hoc test (Tukey test), †Independent T-test,
Table S4. Comparison of changes in blood pressure measures in hypertensive participants according to the season of observation

<table>
<thead>
<tr>
<th>BP measure change</th>
<th>Season</th>
<th>N</th>
<th>Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic blood pressure (mmHg)</td>
<td>Winter</td>
<td>309</td>
<td>-10 ± 17</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>283</td>
<td>-14 ± 20</td>
<td></td>
</tr>
<tr>
<td>Diastolic blood pressure (mmHg)</td>
<td>Winter</td>
<td>309</td>
<td>-10 ± 10</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>283</td>
<td>-11 ± 10</td>
<td></td>
</tr>
<tr>
<td>Pulse Pressure (mmHg)</td>
<td>Winter</td>
<td>309</td>
<td>-0.22 ± 15</td>
<td>0.03</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>283</td>
<td>-3.1 ± 18</td>
<td></td>
</tr>
<tr>
<td>Mean Atrial Pressure (mmHg)</td>
<td>Winter</td>
<td>309</td>
<td>-10 ± 11</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>283</td>
<td>-12 ± 12</td>
<td></td>
</tr>
<tr>
<td>Serum 25(OH)D (nmol/L)</td>
<td>Winter</td>
<td>309</td>
<td>31 ± 46</td>
<td>0.81</td>
</tr>
<tr>
<td></td>
<td>Summer</td>
<td>283</td>
<td>31 ± 39</td>
<td></td>
</tr>
</tbody>
</table>

Independent-Samples T-test, winter=November-April, summer=May-October