|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | **Absolute**  **Effect**  **SMD（95%CI）** | **Certainty** | **Importance** | | |
| VD vs Placebo | | | | | | | | | |  | | | | |  |
| 4 | randomised  trials | | seriousa | very seriousb | not serious | | serious | Undetected | 156 | 164 | 1.83  (0.42,8.08) | ⨁◯◯◯ very low | Not  important | | |
| Ca+VD vs Placebo | | | | | | | | | |  | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 28 | 28 | 1.62  (0.08,31.65) | ⨁⨁◯◯  low | | Not  important | |
| VA+VD+VE vs Placebo | | | |  |  | |  |  |  |  |  |  | | |  |
| 1 | randomised  trials | | not  serious | not serious | not serious | | serious | Undetected | 50 | 50 | 41.30 (2.07,825.60) | ⨁⨁⨁◯ Moderate | | | Not  important |
| Se vs Placebo | | | |  |  | |  |  |  |  |  |  | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 35 | 35 | 2.28  (0.28,18.66) | ⨁⨁◯◯  low | Not  important | | |
| VB11+VB12 vs Placebo | | | |  |  | |  |  |  |  |  |  | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 40 | 40 | 5.56 (0.29,108.21) | ⨁⨁◯◯  low | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  |  |  | | |  |
| 2 | randomised  trials | | seriousa | seriousc | not serious | | serious | Undetected | 60 | 60 | 2.28  (0.28,18.66) | ⨁◯◯◯ very low | Not  important | | |
| ω−3 vs Placebo | | |  |  |  | |  |  |  |  |  |  | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 30 | 30 | 2.65  (0.13,52.17) | ⨁⨁◯◯  low | Not  important | | |

Supplementary Tables S1.GRADE assessment for FBG in different nutrients NMA

a. Mainly some concerns based on RoB2

b.Very Serious inconsistency since I2=100%

C.Serious inconsistency since I2=87%

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S2.GRADE assessment for 2hPG in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | | |  | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | | **Imprecision** | **Publication**  **bias** | | **T** | **C** | **Absolute**  **Effect**  **SMD（95%CI）** | **Certainty** | | **Importance** | | |
| VD vs Placebo | | | | | | | | | | |  | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 50 | | 50 | 15.19  (4.16,55.53) | ⨁⨁◯◯  low | | Not  important | | |
| VA+VD+VE vs Placebo | | | | | | | | | | |  | | | | | |  |
| 1 | randomised  trials | | not  serious | not serious | | not serious | serious | Undetected | 50 | | 50 | 2.18  (0.17,28.45) | ⨁⨁⨁◯ Moderate | | | Not  important | |

a. Mainly some concerns based on RoB2

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S3.GRADE assessment for HOMA-1R in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | **Absolute**  **Effect**  **（95%CI）** | **Certainty** | | **Importance** | | |
| VD vs Placebo | | | | | | | | | |  | | | | | |  |
| 4 | randomised  trials | | seriousa | very seriousd | not serious | | serious | Undetected | 156 | 164 | 5.12  (0.76，34.54) | ⨁◯◯◯ very low | | | Not  important | |
| Ca+VD vs Placebo | | | | | | | | | |  | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 28 | 28 | 2.13  (0.05，96.57) | ⨁⨁◯◯  low | | | | Not  important |
| VA+VD+VE vs Placebo | | | |  |  | |  |  |  |  |  |  | | | |  |
| 1 | randomised  trials | | not  serious | not serious | not serious | | serious | Undetected | 50 | 50 | 2.60  (0.06,115.98) | ⨁⨁⨁◯ Moderate | | | | Not  important |
| Se vs Placebo | | | |  |  | |  |  |  |  |  |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 35 | 35 | 2.54  (0.06，114.09) | ⨁⨁◯◯  low | | | Not  important | |
| VB11+VB12 vs Placebo | | | |  |  | |  |  |  |  |  |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 40 | 40 | 1.82 (0.04,81.46) | ⨁⨁◯◯  low | | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  |  |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 60 | 60 | 2.31  (0.05,104.36) | ⨁⨁◯◯  low | | | Not  important | |
| ω−3 vs Placebo | | |  |  |  | |  |  |  |  |  |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 30 | 30 | 1.98  (0.04，90.08) | ⨁⨁◯◯  low | | | Not  important | |

a. Mainly some concerns based on RoB2

d.Very Serious inconsistency since I2=99%

**CI:** confidence interval; **SMD:** standardised mean difference

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of patients** | | | | |  | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | | **T** | **C** | | **Absolute**  **Effect**  **SMD（95%CI）** | | | **Certainty** | | | **Importance** |
| VD vs Placebo | | | | | | | | | | |  | | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 50 | 50 | 1.71  (1.15,2.55) | | | ⨁⨁◯◯  low | | Not  important | | |
| Ca+VD vs Placebo | | | | | | | | | | |  | | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 28 | 28 | 0.75  (0.44,1.27) | | | ⨁⨁◯◯  low | | | Not  important | |
| VE vs Placebo | | | |  |  | |  |  | |  |  |  | | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 87 | 80 | 2.58  (1.87,3.55) | | | ⨁⨁◯◯  low | | | | Not  important |
| ω−3 vs Placebo | | | |  |  | |  |  | |  |  |  | | |  | | | |  |
| 2 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 57 | 57 | 1.72  (1.16,2.55) | | | ⨁⨁◯◯  low | | Not  important | | |
| ω−3+VD vs Placebo | | | |  |  | |  |  | |  |  |  | | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 30 | 30 | 1.50  (0.90，2.51) | | | ⨁⨁◯◯  low | | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  | |  |  |  | | |  | | | |  |
| 3 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 118 | 118 | 1.75  (1.35，2.27) | | | ⨁⨁◯◯  low | | Not  important | | |
| Se vs Placebo | | |  |  |  | |  |  | |  |  |  | | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 35 | 35 | 1.90  (1.17,3.07) | | | ⨁⨁◯◯  low | | Not  important | | |
| VB1 vs Placebo | | |  |  |  | |  |  | |  |  |  | | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 24 | 25 | 1.85  (1.03，3.29) | | | ⨁⨁◯◯  low | | Not  important | | |
| Zn vs Placebo | | |  |  |  | |  |  | |  |  |  | | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | | 25 | 25 | 2.34  (1.31，4.18) | | | ⨁⨁◯◯  low | | Not  important | | |

Supplementary Table S4.GRADE assessment for hs-CRP in different nutrients NMA

a. Mainly some concerns based on RoB2

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S5.GRADE assessment for TNF-αin different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  | | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | | **Absolute**  **Effect**  **SMD（95%CI）** | **Certainty** | | **Importance** | | |
| VD vs Placebo | | | | | | | | | |  | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 38 | 42 | 0.30  (0.04,2.09) | | ⨁⨁◯◯  low | | Not  important | | |
| Mg+Zn+Ca+VD vs Placebo | | | | | | | | | |  | | | | | | |  |
| 1 | randomised  trials | | not serious | not serious | not serious | | serious | Undetected | 48 | 48 | 1.90  (0.40,9.08) | | ⨁⨁⨁◯ Moderate | | | Not  important | |

a. Mainly some concerns based on RoB2

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S6.GRADE assessment for IL-6 in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | | |  | | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | | | **Absolute**  **Effect**  **SMD（95%CI）** | | **Certainty** | | | **Importance** |
| VD vs Placebo | | | | | | | | | |  | | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 38 | 42 | 51.23 (1.20,2177.63) | | | ⨁⨁◯◯  low | | Not  important | | |
| VE vs Placebo | | | | | | | | | |  | | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 87 | 80 | | 2.11  (0.05,82.08) | | ⨁⨁◯◯  low | | | Not  important | |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  | |  | |  | | | |  |
| 1 | randomised  trials | | not serious | not serious | not serious | | serious | Undetected | 48 | 48 | | 1.83 (0.37,9.12) | | ⨁⨁⨁◯ Moderate | | | | Not  important |

a. Mainly some concerns based on RoB2

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S7.GRADE assessment for MDA in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  | | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | | **Absolute**  **Effect**  **SMD（95%CI）** | | **Certainty** | | | **Importance** |
| Ca+VD vs Placebo | | | | | | | | | |  | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 28 | 28 | 1.50 (0.60,3.75) | | ⨁⨁◯◯  low | | | Not  important | |
| ω−3 vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 2 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 57 | 57 | 2.14 (1.10,4.15) | | ⨁⨁◯◯  low | | Not  important | | |
| ω−3+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 30 | 30 | 2.80 (1.11,7.04) | | ⨁⨁◯◯  low | | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 3 | randomised  trials | | seriousa | very seriouse | not serious | | serious | Undetected | 118 | 118 | 3.72 (2.21,6.25) | | ⨁◯◯◯ very low | | Not  important | | |
| Se vs Placebo | | |  |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 35 | 35 | 1.34 (0.56,3.25) | | ⨁⨁◯◯  low | | Not  important | | |
| VB1 vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 24 | 25 | 4.99 (1.85,13.46) | | ⨁⨁◯◯  low | | Not  important | | |
| Zn vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 25 | 25 | 0.90 (0.36,2.29) | | ⨁⨁◯◯  low | | Not  important | | |

a. Mainly some concerns based on RoB2

e.Very Serious inconsistency since I2=97%

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S8.GRADE assessment for TAC in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  | | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | | **Absolute**  **Effect**  **SMD（95%CI）** | | **Certainty** | | | **Importance** |
| Ca+VD vs Placebo | | | | | | | | | |  | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 28 | 28 | 1.27 (0.47,3.46) | | ⨁⨁◯◯  low | | | Not  important | |
| ω−3 vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 2 | randomised  trials | | seriousa | Seriousf | not serious | | serious | Undetected | 57 | 57 | 0.95 (0.46,1.94) | | ⨁◯◯◯ very low | | Not  important | | |
| ω−3+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 30 | 30 | 0.06 (0.02,0.18) | | ⨁⨁◯◯  low | | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 3 | randomised  trials | | seriousa | very seriousg | not serious | | serious | Undetected | 118 | 118 | 0.66 (0.38,1.15) | | ⨁◯◯◯ very low | | Not  important | | |
| Se vs Placebo | | |  |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 35 | 35 | 0.61 (0.23,1.63) | | ⨁⨁◯◯  low | | Not  important | | |
| VB1 vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 24 | 25 | 1.05 (0.38,2.91) | | ⨁⨁◯◯  low | | Not  important | | |
| Zn vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 25 | 25 | 0.89 (0.32,2.45) | | ⨁⨁◯◯  low | | Not  important | | |

a. Mainly some concerns based on RoB2

f.Serious inconsistency since I2=53%

g.Very Serious inconsistency since I2=90%

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S9.GRADE assessment for GSH in different nutrients NMA

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Certainty assessment** | | | | | | | | | **No of**  **patients** | |  | | |  | | |  |
| **No of**  **studies** | | **Study**  **design** | **Risk of bias** | **Inconsistency** | **Indirectness** | **Imprecision** | | **Publication**  **bias** | **T** | **C** | | **Absolute**  **Effect**  **SMD（95%CI）** | | **Certainty** | | | **Importance** |
| Ca+VD vs Placebo | | | | | | | | | |  | | | | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 28 | 28 | 1.39 (0.43,4.56) | | ⨁⨁◯◯  low | | | Not  important | |
| ω−3 vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 2 | randomised  trials | | seriousa | Serioush | not serious | | serious | Undetected | 57 | 57 | 0.80 (0.34,1.87) | | ⨁◯◯◯ very low | | Not  important | | |
| ω−3+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 30 | 30 | 0.41 (0.12,1.34) | | ⨁⨁◯◯  low | | | | Not  important |
| Mg+Zn+Ca+VD vs Placebo | | | |  |  | |  |  |  |  |  | |  | | | |  |
| 3 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 118 | 118 | 0.87 (0.45,1.69) | | ⨁⨁◯◯  low | | Not  important | | |
| Se vs Placebo | | |  |  |  | |  |  |  |  |  | |  | | | |  |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 35 | 35 | 1.05 (0.33,3.35) | | ⨁⨁◯◯  low | | Not  important | | |
| VB1 vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 24 | 25 | 0.71 (0.21,2.36) | | ⨁⨁◯◯  low | | Not  important | | |
| Zn vs Placebo | | |  |  |  | |  |  |  |  |  | |  | |  | | |
| 1 | randomised  trials | | seriousa | not serious | not serious | | serious | Undetected | 25 | 25 | 0.92 (0.28,3.03) | | ⨁⨁◯◯  low | | Not  important | | |

a. Mainly some concerns based on RoB2

h.Serious inconsistency since I2=77%

**CI:** confidence interval; **SMD:** standardised mean difference

Supplementary Table S10. The results for actual comparisons of FBG in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| E D et al.2013 | placebo | 5.45 | 0.76 | 30 |
| E D et al.2013 | VD | 5.38 | 0.55 | 26 |
| Yanmei Z et al.2019 | placebo | 7.3 | 0.9 | 42 |
| Yanmei Z et al.2019 | VD | 5.2 | 0.4 | 42 |
| Jizhang H et al.2020 | placebo | 5.51 | 1.38 | 38 |
| Jizhang H et al.2020 | VD | 7.13 | 1.24 | 42 |
| Yun C et al.2022 | placebo | 5.89 | 0.87 | 50 |
| Yun C et al.2022 | VD | 5.35 | 0.91 | 50 |
| Asemi Z et al.2014 | placebo | 4.68 | 1.06 | 28 |
| Asemi Z et al.2014 | Ca+VD | 4.25 | 0.64 | 28 |
| Jamilian M et al.2020 | placebo | 5.03 | 0.28 | 25 |
| Jamilian M et al.2020 | ω−3 | 4.7 | 0.38 | 25 |
| Xiangmei L et al.2020 | placebo | 6.18 | 0.31 | 50 |
| Xiangmei L et al.2020 | VA+VD+VE | 5.09 | 0.27 | 50 |
| Jamilian M et al.2019 | placebo | 5.2 | 0.31 | 30 |
| Jamilian M et al.2019 | Mg+Zn+Ca+VD | 4.93 | 0.26 | 30 |
| Karamali M et al.2018 | placebo | 5.28 | 0.45 | 30 |
| Karamali M et al.2018 | Mg+Zn+Ca+VD | 4.88 | 0.63 | 30 |
| Asemi Z et al.2015 | placebo | 5.22 | 1.67 | 35 |
| Asemi Z et al.2015 | Se | 4.94 | 0.39 | 35 |
| Meng C et al.2022 | placebo | 5.43 | 0.67 | 40 |
| Meng C et al.2022 | VB11+VB12 | 4.42 | 0.48 | 40 |

VD, vitamin D; Ca+VD, calcium+vitamin D; ω−3,omega-3 fatty acids; VA+VD+VE, vitamin A+vitamin D+vitamin E; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination; Se, selenium; VB11+VB12, folic acid+vitamin B12.

Supplementary Table S11. The results for actual comparisons of 2hPG in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Yun C et al.2022 | placebo | 7.62 | 1.34 | 50 |
| Yun C et al.2022 | VD | 6.55 | 1.38 | 50 |
| Xiangmei L et al.2020 | placebo | 8.04 | 0.56 | 50 |
| Xiangmei L et al.2020 | VA+VD+VE | 6.61 | 0.48 | 50 |

VD, vitamin D; VA+VD+VE, vitamin A+vitamin D+vitamin E.

Supplementary Table S12. The results for actual comparisons of HOMA-1R in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| E D et al.2013 | placebo | 1.18 | 0.35 | 30 |
| E D et al.2013 | VD | 0.87 | 0.31 | 26 |
| Yanmei Z et al.2019 | placebo | 3.18 | 0.31 | 42 |
| Yanmei Z et al.2019 | VD | 2.1 | 0.29 | 42 |
| Jizhang H et al.2020 | placebo | 3.21 | 1.26 | 38 |
| Jizhang H et al.2020 | VD | 4.23 | 1.43 | 42 |
| Yun C et al.2022 | placebo | 2.89 | 0.22 | 50 |
| Yun C et al.2022 | VD | 2.34 | 0.16 | 50 |
| Asemi Z et al.2014 | placebo | 3.56 | 2.69 | 28 |
| Asemi Z et al.2014 | Ca+VD | 2.02 | 0.89 | 28 |
| Jamilian M et al.2020 | placebo | 3 | 1 | 25 |
| Jamilian M et al.2020 | ω−3 | 2.4 | 0.7 | 25 |
| Xiangmei L et al.2020 | placebo | 3.66 | 1.37 | 50 |
| Xiangmei L et al.2020 | VA+VD+VE | 2.47 | 1.08 | 50 |
| Karamali M et al.2018 | placebo | 4 | 1.6 | 30 |
| Karamali M et al.2018 | Mg+Zn+Ca+VD | 2.8 | 1.2 | 30 |
| Asemi Z et al.2015 | placebo | 4.79 | 3.26 | 35 |
| Asemi Z et al.2015 | Se | 2.43 | 1.39 | 35 |
| Meng C et al.2022 | placebo | 3.51 | 0.78 | 40 |
| Meng C et al.2022 | VB11+VB12 | 2.98 | 0.96 | 40 |

VD, vitamin D; Ca+VD, calcium+vitamin D; ω−3,omega-3 fatty acids; VA+VD+VE, vitamin A+vitamin D+vitamin E; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination; Se, selenium; VB11+VB12, folic acid+vitamin B12.

Supplementary Table S13. The results for actual comparisons of hs-CRP in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Yun C et al.2022 | placebo | 34.88 | 7.69 | 50.00 |
| Yun C et al.2022 | VD | 31.02 | 6.57 | 50.00 |
| Asemi Z et al.2014 | placebo | 6.24 | 4.19 | 28.00 |
| Asemi Z et al.2014 | Ca+VD | 7.38 | 3.69 | 28.00 |
| Jianrong H et al.2015 | placebo | 5.44 | 2.40 | 80.00 |
| Jianrong H et al.2015 | VE | 3.51 | 1.62 | 87.00 |
| Jamilian M et al.2016 | placebo | 6.52 | 3.73 | 27.00 |
| Jamilian M et al.2016 | ω−3 | 5.30 | 3.39 | 27.00 |
| Jamilian M et al.2020 | placebo | 5.60 | 2.30 | 25.00 |
| Jamilian M et al.2020 | ω−3 | 3.90 | 2.00 | 25.00 |
| Razavi M et al. 2017 | placebo | 8.10 | 4.00 | 30.00 |
| Razavi M et al.2017 | ω−3+VD | 6.30 | 4.70 | 30.00 |
| Jing L et al.2020 | placebo | 7.05 | 2.45 | 40.00 |
| Jing L et al.2020 | Mg+Zn+Ca+VD | 5.75 | 3.18 | 40.00 |
| Baolian R et al.2022 | placebo | 6.09 | 1.27 | 48.00 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 5.19 | 1.10 | 48.00 |
| Jamilian M et al.2019 | placebo | 7.00 | 2.60 | 30.00 |
| Jamilian M et al.2019 | Mg+Zn+Ca+VD | 5.70 | 3.70 | 30.00 |
| Asemi Z et al.2015 | placebo | 6.69 | 3.97 | 35.00 |
| Asemi Z et al.2015 | Se | 4.33 | 3.27 | 35.00 |
| Amirani E et al.2022 | placebo | 4.30 | 2.10 | 25.00 |
| Amirani E et al.2022 | VB1 | 3.10 | 1.70 | 24.00 |
| Karamali M et al.2016 | placebo | 6.59 | 4.06 | 25.00 |
| Karamali M et al.2016 | Zn | 3.89 | 1.77 | 25.00 |

VD, vitamin D ; Ca+VD, calcium+vitamin D ; VE, vitamin E ; ω−3,omega-3 fatty acids; ω−3+VD, omega-3 fatty acids+vitamin D ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination ; Se, selenium; VB1, vitamin B1; Zn, zinc.

Supplementary Table S14. The results for actual comparisons of TNF-αin the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Jizhang H et al.2020 | placebo | 85.28 | 12.62 | 38.00 |
| Jizhang H et al.2020 | VD | 103.57 | 16.83 | 42.00 |
| Baolian R et al.2022 | placebo | 19.01 | 5.46 | 48.00 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 15.97 | 3.81 | 48.00 |

VD, vitamin D ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination.

Supplementary Table S15. The results for actual comparisons of IL-6 in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Jizhang H et al.2020 | placebo | 3.32 | 0.47 | 38.00 |
| Jizhang H et al.2020 | VD | 5.86 | 0.76 | 42.00 |
| Jianrong H et al.2015 | placebo | 15.43 | 3.82 | 80.00 |
| Jianrong H et al.2015 | VE | 12.61 | 3.70 | 87.00 |
| Baolian R et al.2022 | placebo | 31.42 | 3.71 | 48.00 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 29.19 | 3.61 | 48.00 |

VD, vitamin D ; VE, vitamin E ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination.

Supplementary Table S16. The results for actual comparisons of MDA in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Asemi Z et al.2014 | placebo | 3.62 | 1.83 | 28.00 |
| Asemi Z et al.2014 | Ca+VD | 3.05 | 0.72 | 28.00 |
| Jamilian M et al.2016 | placebo | 3.90 | 2.20 | 27.00 |
| Jamilian M et al.2016 | ω−3 | 3.10 | 0.90 | 27.00 |
| Jamilian M et al.2020 | placebo | 2.90 | 0.60 | 25.00 |
| Jamilian M et al.2020 | ω−3 | 2.30 | 0.50 | 25.00 |
| Razavi M et al.2017 | placebo | 3.70 | 1.60 | 30.00 |
| Razavi M et al.2017 | ω−3+VD | 2.50 | 0.30 | 30.00 |
| Jamilian M et al.2019 | placebo | 3.30 | 1.30 | 30.00 |
| Jamilian M et al.2019 | Mg+Zn+Ca+VD | 2.60 | 0.20 | 30.00 |
| Baolian R et al.2022 | placebo | 3.92 | 0.84 | 48.00 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 2.81 | 0.46 | 48.00 |
| Jing L et al.2020 | placebo | 3.32 | 0.56 | 40.00 |
| Jing L et al.2020 | Mg+Zn+Ca+VD | 2.64 | 0.26 | 40.00 |
| Asemi Z et al.2015 | placebo | 3.75 | 2.02 | 35.00 |
| Asemi Z et al.2015 | Se | 3.12 | 2.19 | 35.00 |
| Amirani E et al.2022 | placebo | 3.40 | 1.00 | 25.00 |
| Amirani E et al.2022 | VB1 | 2.10 | 0.50 | 24.00 |
| Karamali M et al.2016 | placebo | 4.30 | 2.10 | 25.00 |
| Karamali M et al.2016 | Zn | 4.50 | 1.70 | 25.00 |

Ca+VD, calcium+vitamin D ; ω−3,omega-3 fatty acids; ω−3+VD, omega-3 fatty acids+vitamin D ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination ; Se, selenium; VB1, vitamin B1; Zn, zinc.

Supplementary Table S17. The results for actual comparisons of GSH in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Asemi Z et al.2014 | placebo | 714.42 | 365.83 | 28 |
| Asemi Z et al.2014 | Ca+VD | 622.05 | 127.85 | 28 |
| Jamilian M et al.2016 | placebo | 561.9 | 256.8 | 27 |
| Jamilian M et al.2016 | ω−3 | 456.4 | 103 | 27 |
| Jamilian M et al.2020 | placebo | 455.4 | 81.4 | 25 |
| Jamilian M et al.2020 | ω−3 | 613.1 | 200 | 25 |
| Razavi M et al.2017 | placebo | 484 | 161.2 | 30 |
| Razavi M et al.2017 | ω−3+VD | 594.2 | 60.9 | 30 |
| Jamilian M et al.2019 | placebo | 466.9 | 109.2 | 30 |
| Jamilian M et al.2019 | Mg+Zn+Ca+VD | 486.1 | 115.6 | 30 |
| Jing L et al.2020 | placebo | 470.47 | 105.31 | 40 |
| Jing L et al.2020 | Mg+Zn+Ca+VD | 481.38 | 113.46 | 40 |
| Baolian R et al.2022 | placebo | 458.16 | 96.89 | 48 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 473.26 | 99.73 | 48 |
| Asemi Z et al.2015 | placebo | 512.44 | 215.91 | 35 |
| Asemi Z et al.2015 | Se | 504.47 | 69.57 | 35 |
| Amirani E et al.2022 | placebo | 680.1 | 110.5 | 25 |
| Amirani E et al.2022 | VB1 | 730.1 | 169.1 | 24 |
| Karamali M et al.2016 | placebo | 456.8 | 99.6 | 25 |
| Karamali M et al.2016 | Zn | 466.7 | 120.7 | 25 |

Ca+VD, calcium+vitamin D ; ω−3,omega-3 fatty acids; ω−3+VD, omega-3 fatty acids+vitamin D ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination ; Se, selenium; VB1, vitamin B1; Zn, zinc.

Supplementary Table S18. The results for actual comparisons of TAC in the primary studies.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| author and publication year | Intervention measures | mean | sd | n |
| Asemi Z et al.2014 | placebo | 789.39 | 176.47 | 28.00 |
| Asemi Z et al.2014 | Ca+VD | 751.34 | 129.29 | 28.00 |
| Jamilian M et al.2016 | placebo | 678.40 | 91.90 | 27.00 |
| Jamilian M et al.2016 | ω−3 | 723.60 | 163.80 | 27.00 |
| Jamilian M et al.2020 | placebo | 671.10 | 87.20 | 25.00 |
| Jamilian M et al.2020 | ω−3 | 645.10 | 125.60 | 25.00 |
| Razavi M et al.2017 | placebo | 749.10 | 91.20 | 30.00 |
| Razavi M et al.2017 | ω−3+VD | 998.50 | 82.10 | 30.00 |
| Jamilian M et al.2019 | placebo | 678.40 | 89.90 | 30.00 |
| Jamilian M et al.2019 | Mg+Zn+Ca+VD | 657.60 | 98.10 | 30.00 |
| Jing L et al.2020 | placebo | 629.59 | 90.41 | 40.00 |
| Jing L et al.2020 | Mg+Zn+Ca+VD | 697.84 | 123.42 | 40.00 |
| Baolian R et al.2022 | placebo | 601.17 | 103.45 | 48.00 |
| Baolian R et al.2022 | Mg+Zn+Ca+VD | 691.53 | 119.32 | 48.00 |
| Asemi Z et al.2015 | placebo | 737.14 | 150.55 | 35.00 |
| Asemi Z et al.2015 | Se | 808.06 | 137.06 | 35.00 |
| Amirani E et al.2022 | placebo | 730.60 | 99.00 | 25.00 |
| Amirani E et al.2022 | VB1 | 724.60 | 128.10 | 24.00 |
| Karamali M et al.2016 | placebo | 714.30 | 87.20 | 25.00 |
| Karamali M et al.2016 | Zn | 730.50 | 170.30 | 25.00 |

Ca+VD, calcium+vitamin D ; ω−3,omega-3 fatty acids; ω−3+VD, omega-3 fatty acids+vitamin D ; Mg+Zn+Ca+VD, magnesium-zinc-calcium-vitamin D combination ; Se, selenium; VB1, vitamin B1; Zn, zinc.