| Study or Subgroup       | Vitamin D    | Control     | Mean Difference | Year | Mean Difference |
|-------------------------|--------------|-------------|-----------------|------|-----------------|
|                         | Mean  SD     | Mean  SD    | Total           |      | IV, Random, 95% CI |
| 2.8.1 Vit D deficient <30 ng/ml |              |             |                 |      |                 |
| Amrein 2011             | 13.4 11.7    | 12 14       | 16.3 13         | 3.2% | -0.60 [-11.66, 10.46] 2011 |
| Amrein 2014             | 15.7 20.9    | 237 17.3    | 22.3 238        | 10.4%| -1.60 [-5.49, 2.29] 2014 |
| Ding 2017               | 5.48 4.08    | 29 6.68     | 4.87 28         | 13.0%| -1.20 [-3.54, 1.14] 2017 |
| Hasanloei 2019          | 35.35 16.86  | 48 49.33    | 6.55 24         | 8.0% | -13.98 [-19.42, -8.54] 2019 |
| Miri 2019               | 19.5 12.2    | 22 28.72    | 23.58 18        | 2.8% | -9.22 [-21.25, 2.81] 2019 |
| Karsi 2020              | 6.4 9.8     | 138 5.4    | 6.4 136         | 13.6%| 1.00 [-0.96, 2.96] 2020 |
| Ingels 2020             | 21.7 10.5    | 11 24.8     | 10.8 13         | 4.7% | -3.10 [-11.64, 5.44] 2020 |
| Sharma 2020             | 6.19 2.29    | 20 9.07     | 2.95 10         | 13.4%| -2.88 [-4.97, -0.79] 2020 |
| Sistanizad 2021         | 18.51 8.43   | 16 25.43    | 6.6 14          | 8.1% | -7.12 [-12.51, -1.73] 2021 |
| **Subtotal (95% CI)**   | **533**      | **494**     | **77.4%**       |      | **-3.58 [-6.30, -0.86]** |

Heterogeneity: Tau² = 10.39; Chi² = 33.73, df = 8 (P < 0.0001); I² = 76%
Test for overall effect: Z = 2.58 (P = 0.010)

2.8.2 Mixed baseline Vit D level

| Study or Subgroup       | Vitamin D    | Control     | Mean Difference | Year | Mean Difference |
|-------------------------|--------------|-------------|-----------------|------|-----------------|
|                         | Mean  SD     | Mean  SD    | Total           |      | IV, Random, 95% CI |
| Leaf 2014               | 13.3 14.7    | 36 11.2     | 9.1 31         | 7.5% | 2.10 [-3.67, 7.87] 2014 |
| Han 2016                | 15.9 11.9    | 20 23       | 14 10          | 3.7% | -7.10 [-17.22, 3.02] 2016 |
| Bhattacharyya 2021      | 9.78 6.23    | 63 12.68    | 11.86 63       | 11.4%| -2.90 [-6.21, 0.41] 2021 |
| **Subtotal (95% CI)**   | **119**      | **104**     | **22.6%**       |      | **-1.90 [-6.00, 2.21]** |

Heterogeneity: Tau² = 5.19; Chi² = 3.19, df = 2 (P = 0.20); I² = 37%
Test for overall effect: Z = 0.90 (P = 0.37)

**Total (95% CI)**

|               | 652          | 598         | 100.0%         |      | -3.13 [-5.36, -0.89] |

Heterogeneity: Tau² = 8.53; Chi² = 36.95, df = 11 (P = 0.0001); I² = 70%
Test for overall effect: Z = 2.74 (P = 0.006)
Test for subgroup differences: Chi² = 0.45, df = 1 (P = 0.50), I² = 0%

Favours Vit D Favours placebo