**Supplementary material 3.** Laboratory characteristics of the participants before and after omega-3 fatty acid supplementation.

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| --- | --- | --- | --- |
| **Author; Data; Country.** | **Baseline and at end-of-trial glucose (mg/dL as mean ± standard deviation)** | **Baseline and at end-of-trial insulin (µIU/mL as mean ± standard deviation)** | **Baseline HOMA-IR and at end-of-trial (as mean ± standard deviation)** |
| **Intervention** | **Control** | **Intervention** | **Control** | **Intervention** | **Control** |
| Amini *et al*., 2018Iran (33). | Not reported | Not reported | 12.6 ± 2.8 10.2 ± 2.9 | 11.2 ± 3.5 12.3 ± 4.2 | 2.8 ± 0.8 2.2 ± 0.7 | 2.5 ± 0.8 2.7 ± 0.9 |
|  |  |  |  |  |  |  |
| Jamilian *et al*., 2018; Iran (34). | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |
| Mejia-Montilla *et al*., 2017; Venezuela (35). | Not reported | Not reported | 18.7 ± 4.2 16.5 ± 3.4 | 19.4 ± 4.2 19.6 ± 4.3 | 3.6 ± 0.8 3.3 ± 0.9 | 3.6 ± 0.9 3.7 ± 0.7 |
|  |  |  |  |  |  |  |
| Mirmasoumi *et al*., 2017; Iran (36). | Not reported | Not reported | 13.3 ± 8.7 10.7 ± 6.2 | 12.2 ± 4.7 13.5 ± 4.9 | 3.1 ± 2.1 2.4 ± 1.5 | 2.9 ± 1.2 3.2 ± 1.2 |
|  |  |  |  |  |  |  |
| Mohammadi *et al*., 2012; Iran (37). | 95.2 ± 10.3 85.4 ± 8.95 | 91.7 ± 12.3 92.4 ± 9.92  | 16.5 ± 3.0 15.1 ± 2.7 | 16.4 ± 3.516.4 ± 3.4 | 3.91 ± 1.033.20 ± 0.80 | 3.79 ± 1.283.80 ± 1.11 |
|  |  |  |  |  |  |  |
| Nadjarzadeh *et al*., 2015; Iran (38).  | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |
| Rafraf *et al*., 2013; Iran (39). | 95.2 ± 10.3 85.4 ± 8.9 | 91.0 ± 12.3 92.4 ± 9.9 | 16.5 ± 2.9  15.0 ± 2.7  | 16.4 ± 3.5 16.4 ± 3.4 | 3.1 ± 1.0 3.2 ± 0.8  | 3.8 ± 1.3 3.8 ± 1.1 |
|  |  |  |  |  |  |  |
| Rahmani *et al*., 2016; Iran (40). | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |
| Talari *et al*., 2018; Iran (41).  | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |
| Vargas *et al*., 2011; USA (42).  | 93.0 ± 0.9 96.0 ± 3.1 | 89.0 ± 2.0 91.0 ± 2.0 | 24.9 ± 5.8 27.7 ± 4.7 | 17.6 ± 2.5 19.0 ± 2.2 | 27.1 ± 3.3 28.5 ± 4.0 | 28.1± 3.4 30.6± 4.3 |
|  |  |  |  |  |  |  |
| Vargas *et al*., 2011; USA (42). | 98,0 ± 3,1 96,9 ± 2,0 | 89.0 ± 2.0 91.0 ± 2.0 | 22.0 ± 2.4 22.75 ± 0.7  | 17.6 ± 2.5 19.0 ± 2.2 | 29.8 ± 3.5 29.4 ± 3.2 | 28.1± 3.4 30.6± 4.3 |

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| --- | --- | --- | --- | --- |
| **Author; Data; Country.** | **Baseline and at end-of-trial total cholesterol (mg/dL as mean ± standard deviation)** | **Baseline and at end-of-trial LDL-c** **(mg/dL as mean ± standard deviation)** | **Baseline and at end-of-trial HDL-c (mg/dL as mean ± standard deviation)** | **Baseline and at end-of-trial triglycerides (mg/dL as mean ± standard deviation)** |
| **Intervention** | **Control** | **Intervention** | **Control** | **Intervention** | **Control** | **Intervention** | **Control** |
| Amini *et al*., 2018Iran (32). | 164.4 ± 30.9 165.9 ± 26.7 | 166.2 ± 30.0 167.3 ± 28.4 | 93.5 ± 24.6 93.3 ± 23.0  | 96.7 ± 25.7 94.2 ± 25.3  | 50.0 ± 9.9 49.9 ± 9.3  | 51.3 ± 9.4 52.1 ± 10.6  | 104.2 ± 58.0 113.4 ± 57.2  | 101.1 ± 40.0 105.0 ± 47.9  |
|  |  |  |  |  |  |  |  |  |
| Jamilian *et al*., 2018; Iran (33). | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |  |  |
| Mejia-Montilla *et al*., 2017; Venezuela (34). | 180.1 ± 22.1 154.6 ± 17.6 | 180.5 ± 21.0 176.1 ± 20.8 | 109.3 ± 12.1 84.7 ± 11.2  | 111.7 ± 12.9 110.4 ± 15.4  | 50.4 ± 5.5 52.7 ± 6.7  | 48.5 ± 6.0 47.8 ± 5.6  | 106.7 ± 24.7 86.3 ± 18.9  | 104.1 ± 22.4 102.6 ± 22.9  |
|  |  |  |  |  |  |  |  |  |
| Mirmasoumi *et al*., 2017; Iran (35). | 160.5 ± 37.5 166.4 ± 45.9  | 165.4 ± 33.8 171.1 ± 33.8 | 89.0 ± 34.7 92.5 ± 43.5  | 90.1 ± 28.5 92.9 ± 27.8  | 50.4 ± 9.6 53.8 ± 8.3  | 52.8 ± 10.1 53.8 ± 12.5  | 105.9 ± 61.5 100.8 ± 64.1  | 112.3 ± 58.3 122.0 ± 75.3  |
|  |  |  |  |  |  |  |  |  |
| Mohammadi *et al*., 2012; Iran (36). | 187 ± 32.5 170 ± 32.0  | 188 ± 29.2 187 ± 25.9  | 118 ± 29.4 102 ± 29.6  | 117 ± 31.5 117 ± 27.4  | 43.1 ± 6.55 45.9 ± 6.53  | 44.9 ± 6.11 45.3 ± 4.49  | 127 ± 29.5 119 ± 26.0  | 126 ± 28.5 120 ± 28.5  |
|  |  |  |  |  |  |  |  |  |
| Nadjarzadeh *et al*., 2015; Iran (37).  | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |  |  |
| Rafraf *et al*., 2013; Iran (38). | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |  |  |
| Rahmani *et al*., 2016; Iran (39). | 181.8 ± 28.0 161.5 ± 31.4  | 166.4 ± 29.2 178.6 ± 29.9  | 111.1 ± 26.5 94.4 ± 29.8  | 92.9 ± 25.5 104.8 ± 26.3  | 46.2 ± 10.0 47.0 ± 9.5  | 49.4 ± 8.1 48.1 ± 9.3  | 122.7 ± 61.7 100.6 ± 54.0  | 120.6 ± 59.4 128.3 ± 72.6  |
|  |  |  |  |  |  |  |  |  |
| Talari *et al*., 2018; Iran (40).  | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |  |  |  |  |
| Vargas *et al*., 2011; USA (41).  | 84.5 ± 4.1 84.5 ± 4.1 | 88.6 ± 3.2 83.1 ± 3.8  | 49.9 ± 2.9 52.8 ± 3.2 | 51.7 ± 3.8 46.1 ± 4.7 | 21.1 ± 1.4 21.1 ± 0.9 | 22.0 ± 1.6 22.0 ± 1.4 | 29.2 ± 4.3 23.6 ± 3.1  | 25.0 ± 3.1 26.1 ± 3.4 |
|  |  |  |  |  |  |  |  |  |
| Vargas *et al*., 2011; USA (41). | 89.2 ± 3.8 91.9 ± 3.8  | 88.6 ± 3.2 83.1 ± 3.8  | 59.3 ± 3.2 62.0 ± 3.8 | 51.7 ± 3.8 46.1 ± 4.7 | 19.1 ± 0.9 20.0 ± 0.9 | 22.0 ± 1.6 22.0 ± 1.4 | 26.5 ± 2.7 21.6 ± 2.5 | 25.0 ± 3.1 26.1 ± 3.4 |

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| **Author; Data; Country.** | **Baseline and at end-of-trial total testosterone (ng/mL as mean ± standard deviation)** | **Baseline and at end-of-trial SHBG (nmol/L as mean ± standard deviation)** |
| **Intervention** | **Control** | **Intervention** | **Control** |
| Amini *et al*., 2018Iran (32). | 0.7 ± 0.4 0.6 ± 0.3  | 0.8 ± 0.4 0.9 ± 0.6  | 49.3 ± 9.6 49.9 ± 9.4  | 44.6 ± 13.3 43.5 ± 13.4  |
|  |  |  |  |  |
| Jamilian *et al*., 2018; Iran (33). | 1.4 ± 0.7 1.2 ± 0.6  | 1.2 ± 0.7 1.3 ± 0.7  | 46.7 ± 22.9 52.7 ± 39.3  | 43.5 ± 16.2 47.8 ± 26.8  |
|  |  |  |  |  |
| Mejia-Montilla *et al*., 2017; Venezuela (34). | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Mirmasoumi *et al*., 2017; Iran (35). | 0.9 ± 0.5 0.8 ± 0.6  | 0.9 ± 0.6 0.8 ± 0.5  | 71.1 ± 54.7 79.2 ± 61.4  | 62.9 ± 47.8 63.5 ± 32.3  |
|  |  |  |  |  |
| Mohammadi *et al*., 2012; Iran (36). | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Nadjarzadeh *et al*., 2015; Iran (37).  | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Rafraf *et al*., 2013; Iran (38). | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Rahmani *et al*., 2016; Iran (39). | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Talari *et al*., 2018; Iran (40).  | Not reported | Not reported | Not reported | Not reported |
|  |  |  |  |  |
| Vargas *et al*., 2011; USA (41).  | 0.8 ± 0.1 0.8 ± 0.2 | 1.0 ± 0.2 0.9 ± 0.2  | 17.7± 3.5 16.3 ± 3.7 | 18.4 ± 2.4 16.2 ± 2.5 |
|  |  |  |  |  |
| Vargas *et al*., 2011; USA (41). | 0.8 ± 0.2 0.8 ± 0.3 | 1.0 ± 0.2 0.9 ± 0.2  | 17.2 ± 2.5 17.2 ± 2.8  | 18.4 ± 2.4 16.2 ± 2.5 |