The Combined effect of Vitamin D3 and Omega -3 Supplements on the Association between
Serum Levels of 25-hydroxyvitamin D and Estradiol in Jordanian women with vitamin D deficiency

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ABSTRACT

This randomized clinical trial (RCT) established to study whether the combined effect of vitamin D3 (VD3) and omega-3 fatty acids (Ω-3FA) (VITAL) supplements affects better than either one alone on the association of serum levels between of 25-hydroxyvitamin D 25(OH)D and estradiol (E2) in Jordanian women with VDD.

The RCT designed to test VD3 effects (50 000 international unit (IU) weekly) and Ω-3FA (300 mg daily) for eight weeks, separately and their combination VITAL, on the association serum levels between mid-follicular E2 and 25(OH)D in 86 Jordanian women with vitamin D deficiency (VDD) aged between (20-46) years who were randomized into four groups (control, VD, Ω-3FA and VITAL groups). Fasting serum levels for 25(OH)D and E2 were assessed at baseline and the end of the trial. Paired sample t-test, one way ANOVA, post hoc comparisons using Tukey and HSD multiple linear regression using stepwise method were applied to test the associations in the groups. Differences were considered significant at $p < 0.05$.

The main finding of this study was that VITAL combination (VD3 50 000 IU per week + Ω-3FA 300 mg daily) for 8 weeks significantly increased serum 25(OH)D (mean change = -23.12 ng/ml, *P*= 0.000) and E2 levels (mean change = -14.22 pg/ml, *P*= 0.028). Differences between groups by ANOVA also observed that VITAL increased potency of VD3 to increase serum 25(OH)D. VITAL effect on serum E2 was similar to other study groups with notable in its mean difference

with Ω-3FA group. Daily Ω-3FA supplementation (300 mg) for eight weeks showed significant decrease in serum 25(OH)D (mean change = 7.62 ng/ml, *P*= 0.001) which was accompanied by significant increase of serum E2 levels (mean change = -22.08 pg/ml, *P*= 0.006).

In conclusion VITAL indicted a synergetic effect between VD3 and Ω-3FA on serum 25(OH)D levels lead to significant increase in its levels. Potential synergetic effect of VITAL was accompanied by significant increase in serum mid-follicular levels of E2 within normal ranges.

Keywords: Vitamin D, Vitamin D deficiency, 25(OH)D, estradiol, E2, omega 3, menopausal women, osteoporosis.