

Original Research

Complex Multivitamin Supplementation Improves Homocysteine and Resistance to LDL-C Oxidation

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Objective: We previously reported in an open-label pilot trial that a 24-ingredient multivitamin formula favorably influenced homocysteine concentration and LDL-C oxidation indices following 24 weeks of supplementation. Our current aim was to more thoroughly examine this same formula in a randomized, placebo-controlled, clinical study.

Methods: We examined 182 participants for selected plasma vitamin concentrations and clinically relevant variables including homocysteine, lipids and LDL-C oxidation indices at baseline and six months.

Results: We found no significant differences between groups for any parameter at baseline. Following six months of vitamin supplementation, we observed elevations in plasma concentrations of vitamin B6 (as pyridoxal 5'-phosphate; PLP), vitamin B12, folate, vitamin C, vitamin E and β -carotene ($p < 0.0001$), all of which were significantly greater than respective placebo group changes ($p < 0.0001$). Homocysteine decreased in the treatment (8.38 ± 2.9 vs. 6.93 ± 2.5 $\mu\text{mol/L}$; $p < 0.0001$) and placebo group (8.17 ± 3.0 vs. 7.42 ± 2.2 $\mu\text{mol/L}$; $p < 0.0001$) from baseline to six months, respectively, with reductions in the treatment group being greater than placebo ($p < 0.008$). LDL-C oxidation indices were also improved as LDL-C oxidation rate was decreased (-0.39 $\mu\text{mol/min/g}$ protein; $p < 0.0003$) and LDL-C lag time increased (11.3 min; $p < 0.003$) in supplemented participants. Further analysis also showed that LDL-C oxidation rate was lower ($p < 0.0007$) and LDL-C lag time longer ($p < 0.0001$) for the vitamin group than placebo treatment after six months.

Conclusion: We conclude that a multi-ingredient vitamin formula with antioxidant properties has measurable effects on homocysteine and LDL-C oxidation indices.

Key words: multivitamin, homocysteine, LDL-C oxidation