

Effects of 12-week multivitamin supplementation on red blood cell fatty acid profiles in pre- menopausal females

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PURPOSE: We sought to examine if a multivitamin supplement (MV) affected red blood cell fatty acid profiles in pre-menopausal women during a 12-week supplement intervention.

METHODS: Women between the ages of 21-40 years old who were apparently healthy and refrained from MV supplementation at least one month prior to the trial were recruited from the local Auburn, AL community. PRE testing occurred between 0600-0900 5±2 days following the end of each participants' last menstrual cycle and involved a fasting blood draw, body mass assessment, and blood pressure assessment. Following PRE testing, participants were randomly assigned in a double-blinded fashion to either the MV group (n=43, 24±4 years old, 23.3±2.9 kg/m²) or placebo group (n=51, 23±3 years old, 23.1±2.7 kg/m²). MV (per 2 beadlets-in-capsule serving) contained 50 mcg (2000 IU) of vitamin D3, 6.7 mg alpha tocopherol (10 IU) of vitamin E as mixed tocopherols, 90 µg vitamin K2 MK7, 600 µg (1000 DFEs) 5-methyltetrahydrofolate, 8 µg B12, 8 mg iron, 50 mg magnesium, 1 mg boron, and 320 mg omega-3 fatty acids. The placebo capsules contained safflower oil and cellulose beadlets. Participants were instructed to consume two capsules per day with breakfast for 12 weeks. Following the 12-week intervention, participants reported to the laboratory between 0600-0900 5±2 days following the end of the last menstrual cycle for the POST assessment which replicated PRE testing procedures. Red blood cell fatty acid analysis was performed by a third party (OmegaQuant, Sioux Falls, SD, USA), and serum analyses were performed at a CLIA-certified hematology laboratory (East Alabama Medical Center, Opelika, AL, USA). All dependent variables over time were analyzed using 2x2 (group x time) repeated measures ANOVAs, LSD post hoc tests were performed when significant main effects or interactions were observed, and statistical significance was established at p<0.05.

RESULTS: A significant group x time interaction was observed for red blood cell omega-3 fatty acid content (p<0.001). This variable increased from PRE to POST in the MV group (p<0.001) and placebo group (p<0.05), although POST values were significantly greater in the MV group (p<0.001). A significant increase in red blood cell arachidonic acid (ARA) was also observed in the placebo group (p<0.05), whereas no change was observed in the MV group. A significant group x time interaction was also observed for serum HDL cholesterol levels (p=0.047). MV supplementation tended to increase this variable from PRE to POST (p=0.06), whereas no change occurred in the placebo group.

CONCLUSIONS: These data demonstrate that MV supplementation increased tissue omega-3 fatty acid levels, while potentially preventing increases in red blood cell ARA. MV supplementation may also improve HDL cholesterol levels possibly due to omega-3 fatty acid mediated mechanisms and warrants further investigation.

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