

# Abstract

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## Depressive symptoms, omega-6:omega-3 fatty acids, and inflammation in older adults.

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**OBJECTIVE:** To address how interactions between polyunsaturated fatty acid (PUFA) levels and depressive symptoms were related to proinflammatory cytokine synthesis. Depression and stress promote proinflammatory cytokine production. Dietary intakes of omega-3 (n-3) and omega-6 (n-6) PUFAs also influence inflammation; high n-6:n-3 ratios enhance proinflammatory cytokine production, although n-3 has anti-inflammatory properties.

**METHODS:** Blood samples from 43 older adults (mean age = 66.67 years, SD = 10.09) provided data on PUFAs and tumor necrosis factor (TNF)-alpha, interleukin (IL)-6, and IL-6 soluble receptor (sIL-6r). Depressive symptoms were assessed by the Center for Epidemiological Studies Depression Scale.

**RESULTS:** Depressive symptoms and n-6:n-3 ratios worked together to enhance proinflammatory cytokines beyond the contribution provided by either variable alone, with substantial variance explained by their interaction: 13% for IL-6 and 31% for TNF-alpha, whereas full models accounted for 18% and 40%, respectively. Although predicted cytokine levels were consistent across n-6:n-3 ratios with low depressive symptoms, higher n-6:n-3 ratios were associated with progressively elevated TNF-alpha and IL-6 levels as depressive symptoms increased. Higher levels of sIL-6r were associated with higher n-6:n-3 ratios. Six individuals who met the criteria for major depressive disorder had higher n-6:n-3 ratios and TNF-alpha, IL-6, and sIL-6r levels than those who did not meet the criteria; excluding these six individuals reduced the variance explained by the depressive symptoms and n-6:n-3 ratio interaction.

**CONCLUSIONS:** Diets with high n-6:n-3 PUFA ratios may enhance the risk for both depression and inflammatory diseases.

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