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## **Omega-3 Fatty Acids intervention and DASH Diet Ameliorates Metabolic profiling in Patients with Diabetes Mellitus Type 2**

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### **Abstract**

**Background:** Type 2 diabetes is associated with elevated levels of metabolic abnormalities and systemic inflammation, with increased risk of developing cardiovascular diseases (CVDs) diseases. Omega-3 fatty acids contain two long-chain fats: eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which are found in oily fish. Altering the macronutrient composition of diets in patients with diabetes might alters metabolic and inflammatory abnormalities.

**Objective:** To investigate changes in plasma lipid profile and identify potential inflammatory mediators following dietary approach stop hypertension (DASH) diet and the omega-3 capsules supplementation.

**Design:** A randomized controlled trial with two parallel groups. Both groups followed a DASH diet for 12 weeks, one group consumed 6 capsules per day (placebo) (n = 15), the other 6 capsules/day (n = 17) (1000mg EPA/DHA). Fasting blood samples and clinical parameters were measured at baseline and post intervention.

**Results:** Compared with placebo group, significant differences were observed in body weight, body mass index, blood pressure and interleukin-6 and tumor necrosis factor- $\alpha$  in both groups, but triglyceride (TG) levels and VLDL-cholesterol-significantly decreased in only the fish oil groups ( $p < 0.05$ ). There were no significant difference within and between the placebo and the fish oil groups for adiponectin and leptin (5.53% and 6.48% respectively). No statistically significant effect was observed for fasting glucose, fasting insulin, HOMA of insulin resistance (HOMA-IR) levels, HbA1c, total or LDL, HDL cholesterol in both groups.

**Conclusions:** In type 2 diabetes subjects, fish oil intervention plus DASH diet partially alters lipid metabolism, the production of inflammatory mediators and has no statistically significant effect on glycemic control and adiposity (body weight). The nutritional therapy of omega-3 fatty acids supplements may be further investigated by lipidomics and genomics analysis on both type 1 and 2 diabetic patients.

**Keywords:** Omega-3 fatty acid, DASH diet, Type 2 diabetes, inflammation, lipid metabolism, adiposity

**Abbreviations:** HbA1c: Glycosylated hemoglobin HDL cholesterol: High-density lipoprotein cholesterol HOMA-IR:HOMA of insulin resistance LDL cholesterol: Low density lipoprotein cholesterol VLDL-cholesterol: Very low-density cholesterol

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