








Abstract

# Effect of 15-Week n-3 Fatty Acid Supplementation on Inflammation and Iron Absorption in African Women Living with Overweight and Obesity <sup>†</sup>

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**Abstract:** Background and objectives: Obesity is a state of chronic low-grade inflammation, which may improve with n-3 long-chain polyunsaturated fatty acid (LCPUFA) treatment in populations with low n-3 LCPUFA status. Inflammation reduces iron bioavailability by increasing hepcidin concentrations, leading to iron sequestration in macrophages and reduced intestinal iron absorption. Therefore, the objective of this study was to investigate the effects of n-3 LCPUFA supplementation on inflammatory markers and fractional iron absorption in overweight and obese individuals with chronic low-grade inflammation and a low n-3 LCPUFA status. Methods: In a single group stable iron isotope study, overweight and obese women of African descent (n = 33) with a BMI  $\geq 28$  kg/m<sup>2</sup>, C-reactive protein (CRP) between 2 and 20 mg/L, Hb  $\geq 11$  g/dL and n-3 index  $< 6\%$  were supplemented with ~2 g DHA/EPA daily for 15 weeks. Inflammatory markers, hepcidin, iron status indices and erythrocyte total phospholipid fatty acid composition (% of total fatty acids) were measured at baseline and endpoint. Fractional iron absorption (%) was determined by measuring erythrocyte incorporation of isotopically labelled iron (<sup>58</sup>Fe) at the baseline and endpoint. Sample analysis is ongoing and the results, including fractional iron absorption, for all participants will be available by the time of the conference. Results: Thirty women completed the study. Their mean BMI at baseline was  $36.7 \pm 8.08$  kg/m<sup>2</sup>, they had a mean n-3 index of  $4.57 \pm 0.83\%$ , and median (95% CI) fractional iron absorption (FIA) was 11.8% (7.1–20.1). The n-3 index increased to  $6.59 \pm 0.82\%$  ( $p < 0.001$ ) but there was no change in FIA (9.7% (5.1–15.8),  $p = 0.962$ ). Inflammatory status at baseline was characterized by a median (IQR) CRP of 4.15 (1.50–7.90) mg/L and alpha-1-glycoprotein of 0.99 (0.76–1.11) g/L and there was no change at endpoint. Median serum ferritin was 28.1 (12.3–71.6)  $\mu$ g/L and soluble transferrin receptor was 5.9 (4.8–7.1) mg/L, resulting in body iron stores of 4.80 (0.85–6.92) mg/kg body weight. Discussion: The overweight and obese women in this study had a low n-3 index and high inflammatory status at baseline. Despite improvement of the n-3 index after 15-week supplementation, inflammatory markers and FIA did not improve at endpoint. To understand whether the improvement of the n-3 index was insufficient or the supplement dose too low requires further investigation.



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