
**Abstract**

Polyunsaturated fatty acids (PUFAs) may influence bone health. The objective of this work was to examine associations between plasma phosphatidylcholine (PC) PUFA concentrations and hip measures: (1) femoral neck bone mineral density (FN-BMD) (n = 765); (2) 4-year change in FN-BMD (n = 556); and (3) hip fracture risk (n = 765) over 17-year follow-up among older adults in the Framingham Osteoporosis Study. BMD measures were regressed on quintile of plasma PC PUFAs (docosahexaenoic acid [DHA], linoleic acid [LA], and arachidonic acid [AA]), adjusted for covariates. Hazard ratios (HR) and 95% confidence interval (CI) for hip fracture were estimated by quintile of plasma PC PUFAs, adjusted for covariates. Higher concentrations of PC DHA were associated with loss of FN-BMD over 4 years in women (p-trend = 0.04), but was protective in men in the uppermost quintile compared to men grouped in the lower four quintiles, in post hoc analysis (p = 0.01). PC LA concentrations were inversely associated with baseline FN-BMD in women (p-trend = 0.02), and increased hip fracture risk in women and men (p-trend = 0.05), but body mass index (BMI) adjustment attenuated these associations (p-trend = 0.12 and p-trend = 0.14, respectively). A trend toward a protective association was observed between PC AA and baseline FN-BMD in men (p-trend = 0.06). Women and men with the highest PC AA concentrations had 51% lower hip fracture risk than those with the lowest (HR = 0.49, 95% CI = 0.24-1.00). Opposing effects of PC DHA on FN-BMD loss observed in women and men need further clarification. Bone loss associated with PC LA may be confounded by BMI. High PC AA concentrations may be associated with reduced hip fracture risk.