Lower estimates of net endogenous non-carbonic acid production are positively associated with indexes of bone health in premenopausal and perimenopausal women.

New SA, MacDonald HM, Campbell MK, Martin JC, Garton MJ, Robins SP, Reid DM.

BACKGROUND:

The link between acid-base homeostasis and skeletal integrity has gained increasing prominence in the literature. Estimation of the net rate of endogenous non-carbonic acid production (NEAP) from dietary protein and potassium content enables exploration of the effects of dietary acidity or alkalinity on bone.

OBJECTIVE:

The study aimed to ascertain whether lower dietary acidity (lower dietary protein intake but higher potassium intake- ie, low estimate of NEAP) was associated with greater axial and peripheral bone mass and less bone turnover, independent of key confounding factors.

DESIGN:

Baseline (cross-sectional) results of a population-based study were examined further. The database includes spine and hip bone mineral density (BMD) in 1056 premenopausal or perimenopausal women aged 45-54 y and forearm bone mass and the urinary markers of bone resorption in 62 women. A validated food-frequency questionnaire was used to measure dietary intakes.

RESULTS:

Lower estimates of energy-adjusted NEAP were correlated with greater spine and hip BMD and greater forearm bone mass (P < 0.02 to P < 0.05). Hip and forearm bone mass decreased significantly across increasing quartiles of energy-adjusted NEAP (P < 0.02 to P < 0.03), and trends at the spine were similar (P < 0.09). Differences remained significant after adjustment for age, weight, height, and menstrual status. Lower estimates of energy-adjusted NEAP were also correlated with lower excretion of deoxypyridinoline and were significant predictors of spine and forearm bone mass.

CONCLUSIONS:

These novel findings provide evidence of a positive link between a ratio of lower protein to higher potassium dietary intake (ie, less dietary acid) and skeletal integrity.