

TRENDS IN MINERAL METABOLISM IN THE KIDNEY EARLY EVALUATION PROGRAM (KEEP)

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Background: Chronic kidney disease (CKD) is associated with mineral metabolism dysregulation, cardiovascular disease, and premature mortality. No studies specifically examine mineral metabolism trends in a generalizable sample of patients at increased CKD risk.

Methods: This cross-sectional analysis of calcium, phosphorus, and parathyroid hormone (PTH) studied individuals with CKD stages 3 to 5 in the Kidney Early Evaluation Program (KEEP), a targeted, community-based CKD screening program. The analysis includes 2646 individuals with estimated glomerular filtration rate (eGFR) < 60 mL/min per 1.73m², and calcium, phosphorus, and intact PTH testing results available for the study period November 1, 2005-December 31, 2006. A parallel analysis of National Health and Nutrition Examination Survey (NHANES) 1999-2004 data was performed.

Results: CKD stage 3 accounted for 95% of subjects. As eGFR fell from 55-< 60 mL/min per 1.73 m² to < 30, phosphorus rose (3.70 ± 0.59 mg/dL to 4.15 ± 0.80 ; $p < 0.0001$), calcium fell (9.55 ± 0.47 mg/dL to 9.34 ± 0.62 ; $p = 0.0008$), and PTH rose (66.3 ± 36.3 pg/mL to 164 ± 109 , mean 80.8 ± 57.0 pg/mL; $p < 0.0001$). Multiple linear regression revealed obesity and black race were associated with increased PTH independently of eGFR. NHANES 1999-2004 showed similar trends, with PTH values not as high.

Conclusions: In a community-based CKD screening population, elevated PTH occurs early in stage 3, typically with normal calcium and phosphorus levels. These findings support the importance of including PTH with calcium and phosphorus monitoring for individuals with eGFR < 60mL/min per 1.73m².