

25-HYDROXYVITAMIN D AND INFLAMMATION AND ITS ASSOCIATION WITH HEMOGLOBIN LEVELS IN CHRONIC KIDNEY DISEASE

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Anemia associated with chronic kidney disease (CKD) has substantial public health importance. However, the association of hemoglobin concentrations with 25-hydroxyvitamin D (25(OH)D) levels and inflammation in the setting of decreased kidney function is not well established.

A population-based sample of 16301 participants 18 years and older in the Third National Health and Nutrition Examination Survey, conducted from 1988 to 1994, was analyzed. Glomerular filtration rate (eGFR) in mL/min/1.73 m² was estimated by the abbreviated Modification of Diet in Renal Disease (MDRD) equation. Multivariate linear regression analyses were performed to identify factors independently associated with hemoglobin concentrations.

There were significant, graded, increases in C-reactive protein (CRP) and decreases in 25(OH)D levels and hemoglobin concentrations across eGFR categories: ≥ 90 ; 89-60; 59-30; 29-15 mL/min/1.73m² ($p < 0.0001$ for linear trend). In multivariate analysis, lower 25(OH)D ($p = 0.0014$) and eGFR ($p < 0.0001$) levels and higher CRP ($p < 0.0001$) levels were associated with a decrease in hemoglobin concentrations after adjustment for age, gender, race, weight, systolic and diastolic blood pressure, baseline eGFR, microalbuminuria and lipid and glucose levels. The same findings were obtained in multivariate logistic regression models in which hemoglobin was entered as a categorical variable (≤ 12 g/dL) instead of a continuous measure.

Low 25(OH)D and elevated CRP levels are independently associated with lower hemoglobin concentrations, explaining much of the high prevalence of anemia in persons with kidney disease.