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### Effect of Dietary Phosphate Restriction in Pre-Dialysis Chronic Kidney Disease Patients with Hyperphosphataemia in Southern Nigeria

*Effet de la Restriction Alimentaire en Phosphate chez les Patients Atteints de Maladie Rénale Chronique Pré-Dialyse avec Hyperphosphatémie dans le Sud du Nigéria*

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#### ABSTRACT

**BACKGROUND:** Hyperphosphataemia is a common cardiovascular risk factor in chronic kidney disease (CKD). Dietary counseling and control are key aspects in the management of CKD. Although some studies have shown the beneficial effects of dietary phosphate restriction on cardiovascular and bone health in haemodialysis patients, little is known about its effect in pre-dialysis CKD patients.

**AIM:** To determine the effect of dietary phosphate restriction in pre-dialysis CKD patients with hyperphosphataemia.

**METHODS:** A hospital-based interventional study involving 72 pre-dialysis CKD patients with hyperphosphataemia randomly allocated into 2 groups. Group 1 had nutritional counseling on dietary phosphate restriction while group 2 had no form of dietary phosphate restriction. All participants were placed on a phosphate binder throughout the study period of 3 months. At the end of the third month, a repeat of baseline tests (serum phosphate, calcium, albumin, creatinine and serum lipids) and anthropometric measurements were done and compared between the 2 groups.

**RESULTS:** The mean age in the treatment and control groups were 54.6±14.7 years and 54.9±14.5 years, respectively. The mean serum phosphate (5.7±0.5 vs. 5.5±0.4mg/dl), calcium (7.9±0.9 vs. 7.8±0.7mg/dl), albumin (3.8±0.4 vs. 3.9±0.7g/dl), creatinine (3.9±1.3 vs. 3.7±1.2mg/dl) and body mass index (BMI) (25.0±3.9 vs.25.4±3.1 kg/m<sup>2</sup>) were similar in both groups. Serum phosphate, potassium, fasting blood glucose (FBG), total cholesterol, triglycerides and BMI were significantly reduced while there was no significant change in serum calcium-phosphate product and haematocrit following dietary phosphate restriction in addition to use of phosphate binders. However, on comparison of the changes between the treatment and control groups pre and post- intervention, there was no significant change in serum phosphate but there was significant decrease in serum potassium, triglyceride and FBG.

**CONCLUSION:** The use of phosphate binders in pre-dialysis CKD significantly reduced serum phosphate while additional dietary phosphate restriction had no significant effect on serum phosphate lowering and there was no significant change in nutritional status in pre-dialysis CKD patients with hyperphosphataemia.

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**KEYWORDS-** Chronic kidney disease, Pre-dialysis, Hyperphosphataemia, Dietary restriction

#### RÉSUMÉ

**CONTEXTE:** L'hyperphosphatémie est un facteur de risque cardiovasculaire courant dans la maladie rénale chronique (MRC). Le conseil et le contrôle diététiques sont des aspects clés dans la gestion de la MRC. Bien que certaines études aient montré les effets bénéfiques de la restriction alimentaire en phosphate sur la santé cardiovasculaire et osseuse chez les patients en hémodialyse, peu est connu sur son effet chez les patients atteints de MRC pré-dialyse.

**OBJECTIF:** Déterminer l'effet de la restriction alimentaire en phosphate chez les patients atteints de MRC pré-dialyse avec hyperphosphatémie.

**MÉTHODES:** Étude interventionnelle hospitalière impliquant 72 patients atteints de MRC pré-dialyse avec hyperphosphatémie, répartis aléatoirement en 2 groupes. Le groupe 1 a reçu des conseils nutritionnels sur la restriction alimentaire en phosphate tandis que le groupe 2 n'a reçu aucune forme de restriction alimentaire en phosphate. Tous les participants ont été mis sous un chélateur de phosphate pendant toute la période d'étude de 3 mois. À la fin du troisième mois, les tests de base (phosphate sérique, calcium, albumine, créatinine et lipides sériques) et les mesures anthropométriques ont été répétés et comparés entre les 2 groupes.

**RÉSULTATS:** L'âge moyen dans les groupes traitement et contrôle était respectivement de 54,6±14,7 ans et 54,9±14,5 ans. Les moyennes du phosphate sérique (5,7±0,5 contre 5,5±0,4 mg/dl), du calcium (7,9±0,9 contre 7,8±0,7 mg/dl), de l'albumine (3,8±0,4 contre 3,9±0,7 g/dl), de la créatinine (3,9±1,3 contre 3,7±1,2 mg/dl) et de l'indice de masse corporelle (IMC) (25,0±3,9 contre 25,4±3,1 kg/m<sup>2</sup>) étaient similaires dans les deux groupes. Le phosphate sérique, le potassium, la glycémie à jeun (GAJ), le cholestérol total, les triglycérides et l'IMC ont été significativement réduits, tandis qu'il n'y avait aucun changement significatif dans le produit calcium-phosphate sérique et l'hématocrite suite à la restriction alimentaire en phosphate en plus de l'utilisation de chélateurs de phosphate. Cependant, en comparant les changements entre les groupes traitement et contrôle avant et après l'intervention, il n'y avait pas de changement significatif du phosphate sérique, mais il y avait une diminution significative du potassium sérique, des triglycérides et de la GAJ.

**CONCLUSION:** L'utilisation de chélateurs de phosphate chez les patients atteints de MRC pré-dialyse a significativement réduit le phosphate sérique, tandis que la restriction alimentaire en phosphate supplémentaire n'a eu aucun effet significatif sur la réduction du phosphate sérique et il n'y avait aucun changement significatif de l'état nutritionnel chez les patients atteints de MRC pré-dialyse avec hyperphosphatémie. WAJM 2024; 41 (6): 630 - 637

**MOTS-CLÉS:** Maladie rénale chronique, Pré-dialyse, Hyperphosphatémie, Restriction alimentaire

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