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**The Correlation Between Serum Calcium and Serum Phosphate on the Bone Mineral Density in CKD Patients Who Underwent Hemodialysis and CAPD at Saiful Anwar Hospital Malang, Indonesia**

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**Objectives :** The decrease in phosphate excretion in Chronic Kidney Disease (CKD) results in a decrease of *Clotho* and an increase of FGF-23 that induces a decrease of calcitriol, thus disrupting calcium homeostasis and causing secondary hyperparathyroidism which causes increased bone turnover. There are differences between hemodialysis and CAPD's ability to remove phosphate, which can impact the progression of chronic kidney disease–mineral and bone disorder (CKD-MBD). This study aims to see the comparison and correlation between serum calcium and serum phosphate levels on the density of the bone in CKD patients who underwent hemodialysis and continuous ambulatory peritoneal dialysis (CAPD) at Saiful Anwar Hospital, Malang, Indonesia.

**Methods :** An observational study design with a cross-sectional method was used. The patient was examined for serum calcium, phosphate, and bone density which was measured using dual-energy X-ray absorptiometry (DXA). Data analysis was used to assess correlation using Pearson (serum calcium level to bone density) and Spearman (serum phosphate level to bone density), to assess comparison in serum calcium, serum phosphate, and the density of the bone using an unpaired T-test.

**Results :** There was a significant relationship between calcium levels and the spine (p 0.001), total right hip (p 0.024), neck hip sinistra (p 0.016), total hip sinistra (p 0.003), mean of neck hip bilateral (p 0.022) and mean of total hip bilateral (p 0.003) bone mineral density. However, there was no significant relationship between phosphate levels to bone mineral density. Calcium levels in the hemodialysis group were higher than in CAPD, while phosphate levels in the hemodialysis group were lower than in CAPD. The bone density was higher in the hemodialysis group than in the CAPD group.

**Conclusions :** Serum calcium levels correlate with bone density, while serum phosphate levels do not correlate with bone density in CKD patients.

Table 1. Correlation between Calcium Level and Bone Density.png

**Table 1. Correlation Between Calcium Level and Bone Density**

	P	Pearson Correlation	Correlation
Spine	.001	.237**	Weak Correlation
Neck Femur Dextra	.086	-	No Correlation
Total Femur Dextra	.024	.157*	Very Weak Correlation
Neck Femur Sinistra	.016	.167*	Very Weak Correlation
Total Femur Sinistra	.003	.208**	Weak Correlation
Mean Neck Femur	.022	.159*	Very Weak Correlation
Mean Total Femur	.003	.208**	Weak Correlation
1/3 Radius Distal	.571	-	No Correlation

Table 1. Correlation between Calcium Level and Bone Density.png

**Table 2. Correlation Between Phosphate Level and Bone Density**

	P	Spearman Correlation	Correlation
Spine	.759	-	No Correlation
Neck Femur Dextra	.956	-	No Correlation
Total Femur Dextra	.796	-	No Correlation
Neck Femur Sinistra	.481	-	No Correlation
Total Femur Sinistra	.215	-	No Correlation
Mean Neck Femur	.866	-	No Correlation
Mean Total Femur	.238	-	No Correlation
1/3 Radius Distal	.689	-	No Correlation