
Association of Serum Vitamin D with Bone Turnover Markers, Trabecular Bone Score and Bone Mineral Density in A Group of Community Living Adult Women in Bope-Poddala MOH Area

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Although hypovitaminosis D is prevalent in the community, its associations have not been studied in our country. This study investigated the association of serum 25-hydroxyvitamin D [25(OH)D] with bone turnover markers, trabecular bone score (TBS) and bone mineral density (BMD) in a group of adult women. A total of 333 adult women >20 years of age, living in Bope-Poddala MOH area were recruited by age stratified random sampling method. Serum 25(OH)D (total), bone formation marker; procollagen type I N-propeptide (PINP) and bone resorption marker; cross linked C-telopeptide of type I collagen (CTX) were measured using ELISA. Vitamin D cut-off levels were defined as deficient (<20 ng/mL), insufficient (20-29 ng/mL) and sufficient (\geq 30 ng/mL). TBS, BMDs of hip (THBMD), femoral neck (FNBMD), spine (LSBMD) and whole-body (TBBMD) were measured by DXA. Multivariate analysis (adjusted for possible confounders) was used to compare the means between those with normal (n=194) and low 25(OH)D levels (insufficient or deficient, n=139). Partial correlation (adjusted for possible confounders) was used to elicit correlations between variables. Mean CTX and PINP levels were significantly high in vitamin D deficiency/insufficiency vs normal group (CTX; 0.60 ng/mL vs 0.50 ng/mL, $p=0.004$), (PINP; 325 pg/mL vs 287 pg/mL, $p=0.046$). Mean TBS, THBMD, FNBMD and TBBMD were significantly lower in vitamin D deficiency/insufficiency vs normal group (TBS; 1.283 vs 1.307, $p=0.011$), (THBMD; 0.867 g/cm² vs 0.904 g/cm², $p=0.001$), (FNBMD; 0.718 g/cm² vs 0.750 g/cm², $p=0.003$), (TBBMD; 0.970 g/cm² vs 0.996 g/cm², $p=0.005$). Further, serum 25(OH)D had negative correlation with CTX ($r=-0.20$, $p<0.001$) and PINP ($r=-0.124$, $p=0.023$) and positive correlation with TBS ($r=0.14$, $p=0.010$) and BMD ($r=0.11-0.19$, $p<0.04$). In conclusion, Vitamin D deficiency/insufficiency is associated with increased bone turnover, lower BMD and poor bone microarchitecture.

Keywords: Bone turnover markers, Serum vitamin D, Bone mineral density